POPULAR SCIENCE

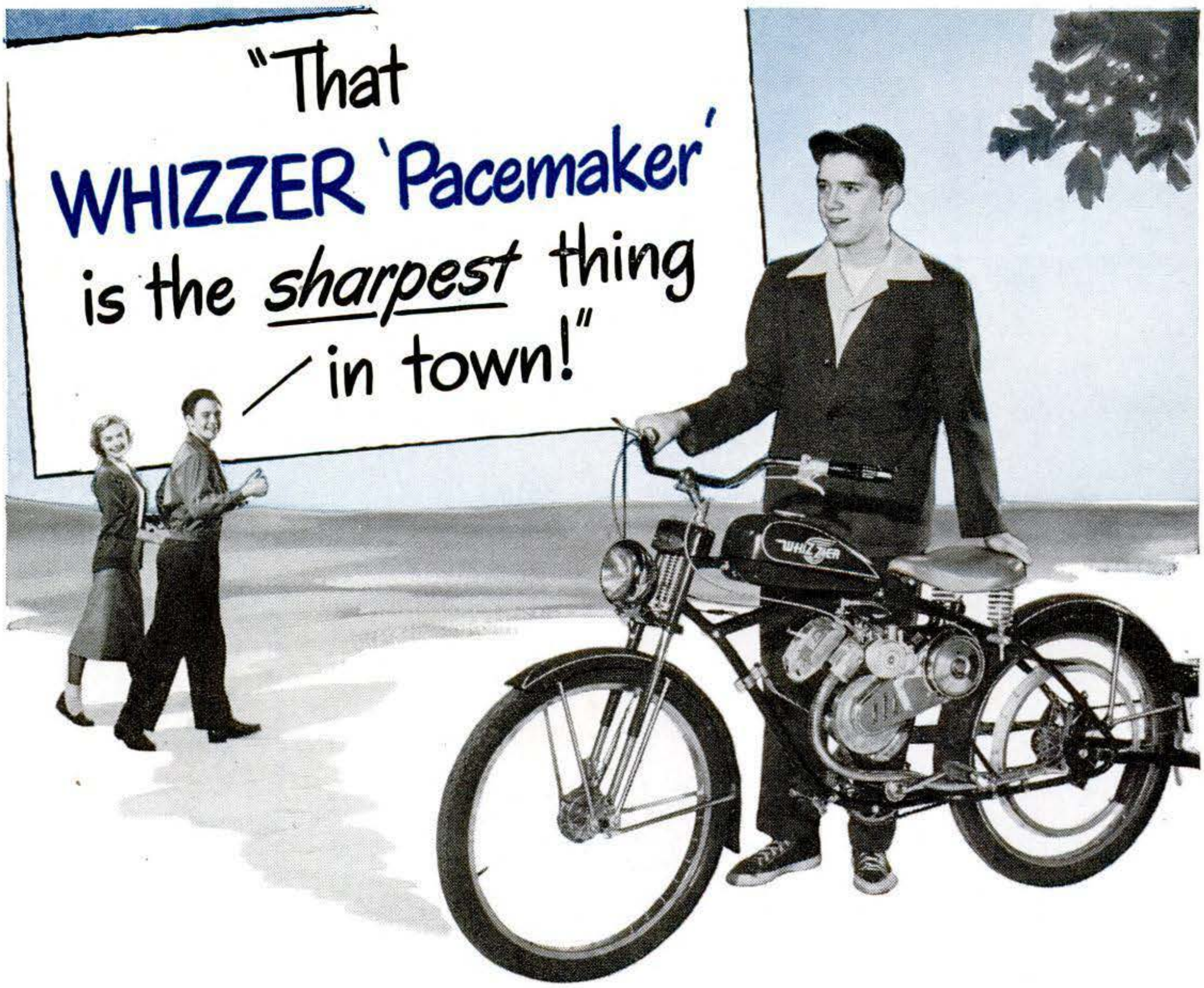
May 1949

25¢

Monthly

Is U.S. Building a "New Moon"?

PAGE 106



The only COMPLETE MOTOR BIKE specially designed for the famous Whizzer Motor

AT A NEW LOW PRICE!

Check these exclusive features...

- ★ **Extra safety**—special, heavy duty motorbike frame.
- ★ **"Racy" look**—long, low lines.
- ★ **Smooth ride**—Whizzer-developed special Telescopic Front Fork, Dual-Coil Spring Suspension.
- ★ **Better control**—24" wheels provide safer, extra-low center of gravity.
- ★ **Travel comfort**—adjustable motorcycle-type saddle, sponge rubber filled, genuine cowhide cover.
- ★ **Smooth stops**—positive braking power, safety reserve for emergencies.
- ★ **Powered by the famous Whizzer Bike Motor...** 2½ sturdy horsepower... 35 miles per hour... 125 miles per gallon... Twist-Grip controls... 4-cycle design. Finest in the field for over ten years.

ASK YOUR DEALER ABOUT BUDGET TERMS!

For Quick Guide to your Nearest Whizzer Dealer —call Western Union, ask for Operator 25 for dealer's address. No charge of any kind to you!

*Model illustrated includes following optional, extra-cost equipment: Bi-Lite generator and light set; automatic clutch.

NOW ONLY $199.50

COMPLETE*
F.O.B. Pontiac, Mich.
Fed. Tax Extra

FREE! "FULL-DETAIL" CATALOG

Close-ups of "Pacemaker." Describes parts, operation. Shows complete line of special Whizzer accessories.

WHIZZER MOTOR CO., PONTIAC, MICH.

Please send special illustrated catalog.

Name_____

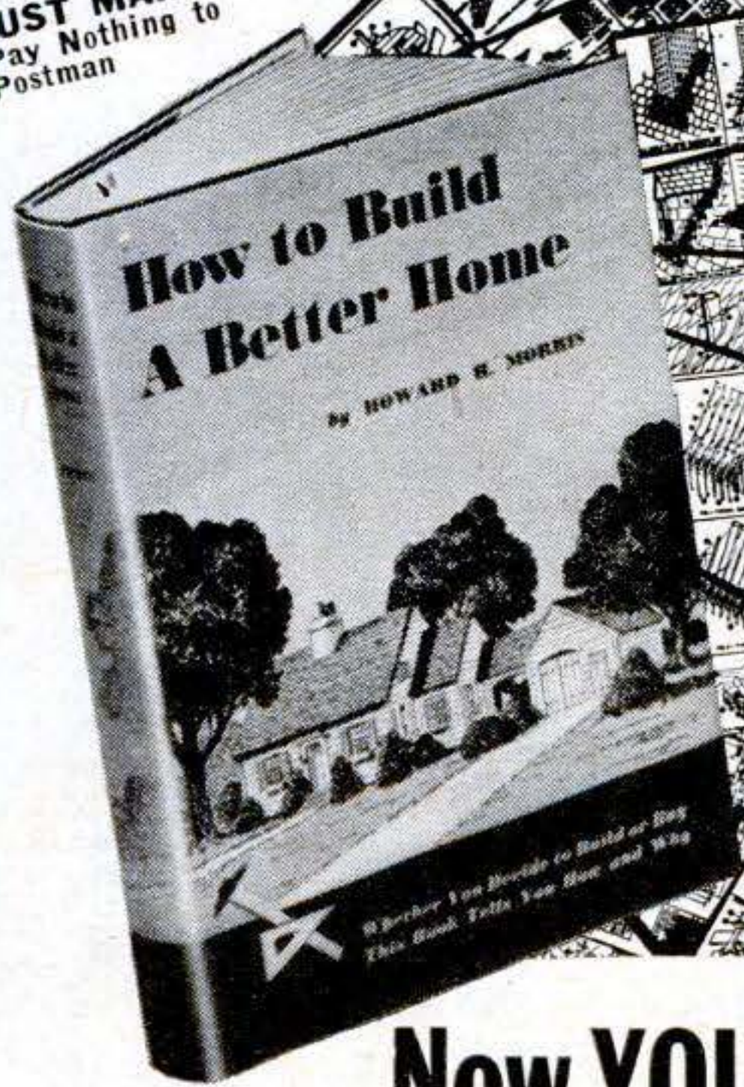
Street_____

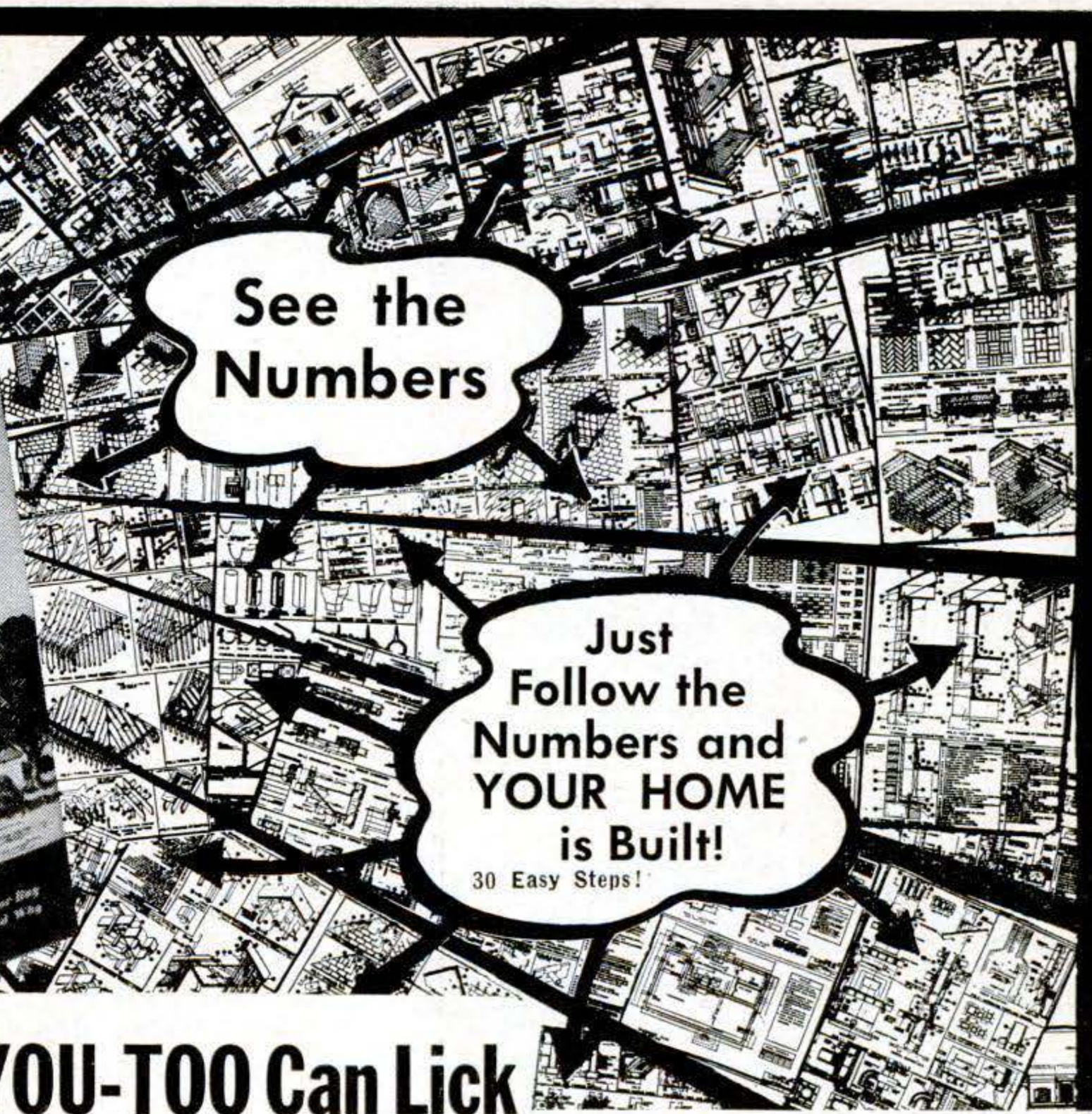
City_____ Zone____ State_____

Copyrighted material

FREE
7-DAY TRIAL

JUST MAIL COUPON
Pay Nothing to Postman





Now YOU-TOO Can Lick ANY Home Building Job!

Secrets That Produce Fine Homes—Completely Revealed in This Great Easy-Reference Book!

How to Start • **Deciding** Upon Ownership • **How** to Select Service • **How** to Finance • **Building** Lot • **How** to Plan • **Fill** Out Documents • **Obtain** Good Construction • **How** to Prevent Termites • **Decay** • **Corrosion** • **How** to Lay Out Building, Excavate, Grade • **Monolithic** Concrete Construction • **Masonry** • **Footings** • **How** to Build Piers, Foundation Walls • **Basement** • **How** to Waterproof • **Build** Chimneys, Fireplaces • **How** to Select Woods • **House** Framing Methods, Details • **Finish** Carpentry, Millwork • **How** to Insulate • **Sheet-Metal** Work, Roofing, Stucco, Lath, Plaster • **How** to Paint, Finish • **Tile** Work, Electrical Work, Plumbing, Heating • **List** of Publications for Home Builder (Most are free or cost few cents) • **Stock** Plans • **Taxes,** Insurance, Interest, Maintenance, Assessments • **How** to Choose Bank, Real Estate Dealer, Contractor • **Locating** House on Lot, Tax Searches, Comparative Costs, Design • **Prefabricated** Houses? Bungalows, List of Usual Mistakes • **Architectural** Don'ts", 300 additional paragraphs important information.

QUICK REFERENCE INDEX TO SPECIAL PAGE SIZE PLATES (HUNDREDS OF ILLUSTRATIONS)

Footings—foundation walls—basements • **Garage** floor, footings, etc.—septic tank—grease trap—basement window • **Concrete** porches, steps, automobile runways, driveways, walks • **Brick** steps, terraces • **Brick,** tile, stone wall details—flagstone, stepping stone walks • **Masonry** dwellings—brick veneer walls • **Chimney,** fireplace details • **Balloon** framing details (minimum-shrinkage type), (box sill type) • **Roof** framing details • **Basement** columns, girders—framing openings—bridging • **Miscellaneous** details • **Watertables**—exterior sidewalls, siding, shingles—cornices—porch columns • **Double-hung** wood window details • **Door** frame details—points for millwork—stock doors, windows—sash details • **Paneling**—stairwork—baseboard details • **Termite** shields • **Flashing** details • **Gutters,** leaders (downspouts) • **Roofing** details.

One Simple Fact May Repay HUNDRED Times Small Cost. A Book You Will Refer to for Years!

HUNDREDS OF LETTERS ARE POURING IN!

"Book arrived in time to save me a serious error in regard to my lot." "I just caught the basement floor in time." "Best ever written on the subject of houses." "This is my third copy. Every time I show it to one of my friends he talks me out of my copy." "We are making many changes in our plans because of articles we have read in the book." "I do not feel that I could proceed without a copy of this book." "Wish to thank you." "Finest of its kind I have seen."

"How to Build a Better Home" Is Showing Tens of Thousands How to Handle Any Construction Job—Faster, Easier! Now Let It Build Your House for YOU!

HERE'S how to "knock over" every construction job—including "tough-nuts". Thousands are letting "How to Build a Better Home" tackle toughest building, remodeling, alteration problems — in LESS TIME, with less work, more fun than ever!

Everything You Need to Know

All diagrams — **only** book of its kind — **8 years in making!** Worth $50! Answer to prayers!

The WORKS—how to plan, construct, supervise—simply, clearly explained. Jam-packed with everything you need. Your insurance against warped floors, smoking chimneys, sagging insulation, decay.

Now let these hundreds architect's diagrams, instructions, facts go to work for YOU! Tackle **anything**—footings, roof, small bungalow, two-family house, light frame construction, solid brick—quickly, easily, right! Just look up job in index; then let diagrams show you number by number, step by step, how to put homes together!

WHY PAY RENT?

If you are leery of 'cheap' building, shoddy work, poor design—if fed-up dreaming, get started! Prove it yourself, free.

Why pay landlord? Get more, better rooms, for less than rent! Why wait, hope, never know? Get started **now.** Be ready for "rainy days". Remember, how you swore you would own your own home. With this book you **can. Your security!** Rent to others, add another floor, apartment, get extra income to pay off taxes, interest, mortgage!

SAVE THOUSANDS OF DOLLARS

Whether you spend $2,000 or $20,000—use architect or stock plans—in Maine, Calif., or Florida—let this book help you. Get "in the know," talk building language. Be respected, admired, proud. Here is happiness, a place of your own! The way to lick housing shortage.

Employ uneducated labor—show them how—save THOUSANDS. Try it YOURSELF FREE. How can you lose? Start small, build UP. Get home, free and clear. Pay loan back in small sums like rent, yet get **twice** as much room! Aluminum windows, radiant heating, air conditioning, garbage disposals. Build part now, rest later, pay as you go!

How To Build—from Plans to Paint

See for yourself. One page can be worth fortune. We have files and files of letters to prove. You can do own plans in evenings. WHERE TO BEGIN? Just a quick glance at contents will show you. Those who bought write they have never seen such a book for any price, anywhere!

HUNDREDS Construction Details

Every type home discussed in FULL. Read what fraction of enthusiastic purchasers have to say. See how they bless day they sent coupon for free examination. See how they came back with orders for friends, relatives—business associates. Read, study, every word in this "ad"—FOR WE TELL YOU THE TRUTH, and we back up these little printed words with this:

SEND NO MONEY Examine it—7 Days FREE!

Don't spend cent. Just mail coupon. See beautiful buckram binding, large 8½" x 11" size. See how to supervise or build YOURSELF — even if you know **nothing** NOW! Then, if you are THRILLED, send only $3.98 (plus shipping charges). (Two payments if you wish.) If **not** thrilled, return book, and pay nothing! This is your chance. **Awake!** Mail FREE EXAMINATION COUPON NOW, to the Westport Publishing Company, Dept. 1131, Westport, Conn.

FREE Examination Coupon—Mail Now

The Westport Publishing Company
"Books of Merit", Dept. 1131, Westport, Conn.

Send for week's FREE EXAMINATION, "How to Build a Better Home." After 7 days I either return and owe nothing, or keep it and send $3.98 (plus shipping charges). **(Or will split it into two payments, the second payment to come a month later.)**

Name.....Age...
(please print)

Address.....

City & Zone.....State.....

☐ Save shipping charges. Enclose $3.98 (check or money order) WITH coupon. WE then pay shipping. If not thrilled, return and we refund $3.98 by AIR MAIL! Foreign Orders $4.50 Cash with order.

Copyrighted material

FOUNDED 1872 • VOL. 154. NO. 5

POPULAR SCIENCE

MECHANICS AND HANDICRAFT Monthly

MAY, 1949

Perry Githens, EDITOR

Fred O. Newman, Volta Torrey
MANAGING EDITORS

Howard C. Jensen, ART EDITOR

Harry Walton, MECHANICS & HANDICRAFT EDITOR

Hartley E. Howe, Frank Rowsome, Jr.
ASSISTANT MANAGING EDITORS

ASSOCIATE EDITORS: Howard Allaway, Alden P. Armagnac, Devon Francis, Robert Gorman, Sheldon Gallager, Herbert Johansen, Martin Mann, Denis Sneigr, Robert P. Stevenson.

ART DIRECTOR: Harry Samuels. ART ASSOCIATES: Herbert Anthony, Eric Karminski, Jr., Richard Meyer, Edward Hallstrom, Frances Cooper (Production).

EDITORIAL ASSISTANTS: Julia Charnif, Beatrice Eldridge, Carol Ennis, Charlotte Korch, Georgette Sparks, Ruth Westphal.

STAFF PHOTOGRAPHERS: W. W. Morris (Chief), Hubert Luckett, Orlando Guerra (Darkroom).

WESTERN EDITOR: Andrew R. Boone (Los Angeles).

WASHINGTON CORRESPONDENT: John F. Loosbrock.

EDITORIAL OFFICES: 353 Fourth Avenue, New York 10, N. Y. Manuscripts and illustrations submitted at regular rates should be so marked, addressed to "The Editors" and accompanied by stamped, self-addressed envelope. Popular Science Monthly exercises all possible care but assumes no responsibility for unsolicited material.

TRADE NAMES by which products or materials are commonly known are indicated by the symbol ®. These names may or may not be Registered Trademarks (see PS, Mar. '49, p. 294). This symbol is used only as a service to readers and Popular Science Monthly assumes no responsibility by use or omission.

Godfrey Hammond, PUBLISHER

Stephen P. Glennon, ADVERTISING DIRECTOR

Edward Roeder, Jr., ADVERTISING MANAGER

ADVERTISING OFFICES: NEW YORK—353 Fourth Avenue; CHICAGO—360 North Michigan Avenue; DETROIT—820 Book Building; SAN FRANCISCO—1003 TWA Building; PORTLAND (ORE.)—907 Terminal Sales Building; CLEVELAND—328 Citizens Building; LOS ANGELES—Granada Building.

Popular Science Monthly is published monthly at 353 Fourth Avenue, New York 10, N. Y., by Popular Science Publishing Co., Inc., Godfrey Hammond, President and Treasurer; R. C. Wilson, Raymond J. Brown, Stephen P. Glennon, Vice-Presidents; F. W. Briggs, Secretary. Entered as second-class matter Dec. 28, 1918, re-entered as second-class matter July 26, 1948, at the Post Office in New York, N. Y., under the act of March 3, 1879; additional entry as second-class matter at Dayton, Ohio. Entered as second-class matter at the Post Office Department, Canada. Printed in U.S.A. Copyright, 1949, by Popular Science Publishing Co., Inc. All rights reserved in the United States, Great Britain, and in all countries participating in the International Copyright Convention and Pan-American Copyright Convention. Yearly subscriptions to United States, its possessions and Canada, $3.00 (2 years, $5.50; 3 years, $7.50); foreign countries $1 per year extra. Subscribers must notify us of change of address four weeks before next publication date. Be sure to give both old and new addresses, including zone numbers. Vol. 154: No. 5.

TABLE OF CONTENTS

Science News

Pipes for Purity....105
How Raindrop Really Looks....117
March of Science....142
Zoo Found Engraved on Pebble....145
Dogfish Aid Medical Research....165

Science at Work

Parajumpers Carry Own Teletypewriter..113
Swift Kick for Missiles....116
Secret Weapon Previewed....116
Water Tap Weighs 100 Tons....127
Why Must We Suffer Smoke?....136
New Insulator Is Boy-Proof....144
Photo Cell Counts Blood Cells Faster....170
Light Guides Driverless Truck....171
Books Read from Microcards....172

PS Features

Is U.S. Building a New Moon?....106
Gadgets Mechanize Chicken Farm....118
New Cruiser Packs 8-Inch Automatics....121
So A-Bombs Aren't So Bad?....124
Projector Checks Threads....127
What's What in the Platter Battle....132
Want to Buy a Brain?....148
New Paints that a Novice Can Use....153
This Bridge Goes Under Water....158
Building a Shirt Around a Man....160
Trick Sling Lifts Six Barrels....164
Your New Eyes and Ears....166
Fluorescent Strip Lights Road....176
How to Foil a Flood....190
Electric Gate Lets Cat Out....203
Tricks on a Cycloid Track....244

Aviation

How to Hop 5,000 Miles Nonstop....128
Big Blow Is Vacuum-Made....141
What's New in Aviation....146
More Wind for Wind Tunnels....171

Automobiles

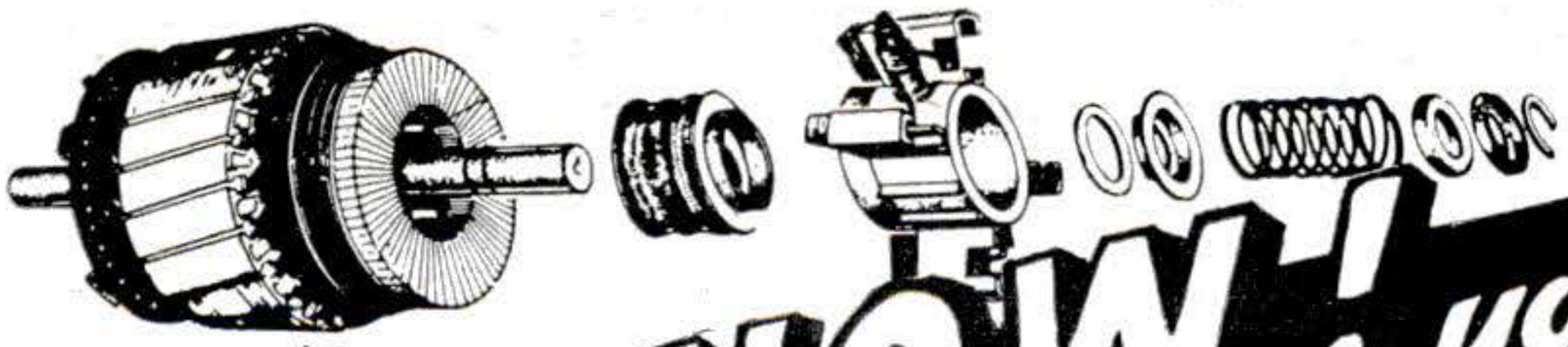
New Steel Tops Look Convertible....134
Water Revolves Car Brush....177
Gus Turns the Heat Off....178
Water-Cooled Motorcycle....182
Low-Cost Convertible....184
How an Expert Fixes a Flat....185
Hints from the Model Garage....236

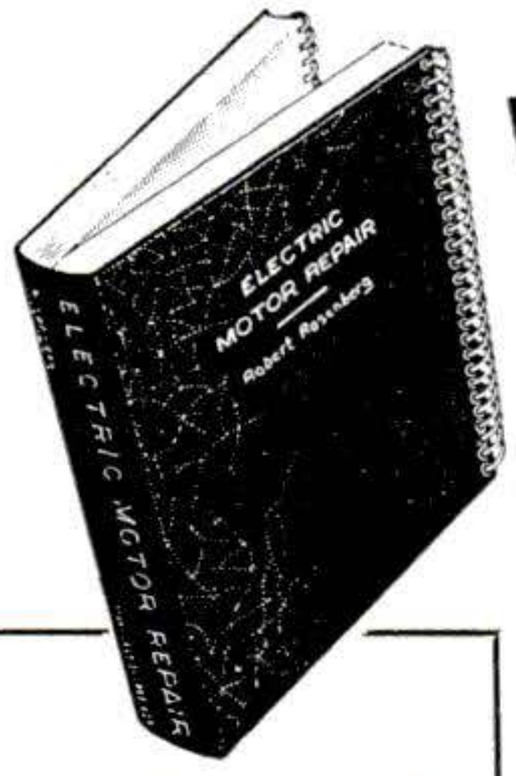
Inventions

New Ideas from the Inventors....114
Ice Improves Concrete Block....130
Mobile Saw Cuts Logs and Costs....164
Retractable Skeg Aids Barge....171
Stool Lightens Dentist's Work....172
Vaporizer Degreases Machinery....173

Continued on page 4

Copyrighted material





NOW! you can LEARN ELECTRIC MOTOR REPAIR

. . . A good-paying, modern profession

. . . for only $5

FOR THE COMPLETE TRAINING

(while the present low-cost supply lasts)

OPPORTUNITIES EVERYWHERE!

It pays to specialize in "something different!" Don't drift into a rut! Don't train for something that everybody and his brother are studying! Consider the facts. . . . The average small home has at least 11 electric motors! Big homes have many more—in phonographs, recorders, oil burners, refrigerators, washers, fans, clocks, mixers, cleaners, air conditioners, etc., etc. Millions more in office, industrial, mining, and transit equipment. Be the well-paid expert who can keep them working!

THIS LOW COST OFFER MAY NOT BE REPEATED!

Only a few hundred copies of the second printing of ELECTRIC MOTOR REPAIR training course book remain. With the tremendous increases in paper, printing and binding costs, it seems unlikely that we'll be able to offer the book again at today's amazingly low price of $5. Send coupon today . . . while the present supply lasts.

Every day, more and more electric motors and motor control systems are being used BOTH in industry and in home appliances. The expert who can install, repair and keep them working properly is a valuable man in this Electrical Age. The pay is surprisingly good. The field is tremendous—and growing rapidly. Trained men find opportunities everywhere for full or part time work. ELECTRIC MOTOR REPAIR, the big 560 page training course book teaches you the work step by step—quickly and easily—at home in spare time. There is no other book like it. Ideal for beginners or for actual bench use in busy shops. Thousands of copies are already in use in leading vocational schools, shops, and, most important of all, for home study.

SHOWS YOU HOW . . . Every Step of the Way!

Based on what you can learn quickly at home from ELECTRIC MOTOR REPAIR, you can train for prompt, profitable installation, servicing, repairing and complete rewinding of practically any motor in use today. You learn fast! You learn right! Every subject is clearly and simply explained by text AND ALSO by more than 900 clear-cut illustrations and diagrams. You not only read what to do—you actually SEE how it is done. Quick reference guides tell you how to handle specific jobs. When a certain motor comes in for repairs, just look it up. ELECTRIC MOTOR REPAIR tells you what to do—and exactly how to do it.

ELECTRIC MOTOR REPAIR is designed for use right at the service bench. Unique Duo-Spiral Binding divides the book into two sections so that both text and related diagrams can be viewed together. An instructor standing by your side could hardly do better! ELECTRIC MOTOR REPAIR covers the entire field from alternating—and direct-current motors and generators, etc., to mechanical and electrical and electronic control systems. Right down the line, it explains every detail of trouble diagnosing, repair, rewinding and maintenance in a way you can easily understand.

PRACTICE FROM IT FOR 10 DAYS . . . At *OUR* Risk!

Send FREE EXAMINATION Coupon today! Practice from ELECTRIC MOTOR REPAIR for 10 full days. See for yourself that really good home training doesn't have to cost you a lot of money. See how interesting the work is—how easy it is to learn by this method. If not more than satisfied with the book, return it postpaid—and no questions will be asked. You be the judge!

LEARN FAST...No Lessons to Wait for!

If sold as a course and sent to you in lesson form, ELECTRIC MOTOR REPAIR would be a bargain **at 10 times the price!** You get it all at once. You learn rapidly. Here are just a few of the subjects covered:

- Split-Phase Motors
- Capacitor Motors
- Repulsion-type Motors
- Polyphase Motors
- Alternating-Current Motor Control
- Direct-Current Armature Winding
- Direct-Current Motors
- Direct-Current Motor Control
- Universal, Shaded-pole, and Fan Motors
- D-C Generators; Synchronous Motors and Generators
- Electronic Motor Control
- . . . and essential motor data

TEN-DAY FREE EXAMINATION

Dept. PS-59, MURRAY HILL BOOKS, Inc.
232 Madison Avenue, New York 16, N. Y.

Send me the big, 560-page ELECTRIC MOTOR REPAIR training course book for 10 days examination on approval. In 10 days I will either send $5 plus a few cents postage or return books postpaid. (We pay postage on orders accompanied by cash or money order; same return privilege.) Books sent for examination in U.S. only. Price outside U.S.A. $5.50 postpaid, cash with order.

Name . . . . . .

Address . . . . . .

City & Zone . . . . . State . . . . . .

TRAIN FOR GOOD PAY IN A FIELD THAT ISN'T CROWDED!

Copyrighted material

1949 OUTBOARD SENSATION!
NEW JOHNSON QD!

You operate it by Gear Shift Control. Move the knob (shown above) and go from Neutral to Forward or Reverse. It's so easy!

Fuel is automatically fed to the motor from the separate, Mile-Master Fuel Tank (5 gal.–16 lbs.). Cruise for *hours* without refueling.

High power* — a compact, 56-pound ball-of-fire — *yet it trolls!*

See the QD at your Johnson dealer's. Look for his name under "Outboard Motors" in your classified telephone directory.

JOHNSON MOTORS
500 Pershing Rd., Waukegan, Ill.
Johnson Motors of Canada
Peterboro, Canada

*10.0 — O. B. C. Certified Brake H.P. at 4000 r.p.m.

FREE Handy Chart

Write for the 1949 Sea-Horse Handy Chart. Illustrates and charts the QD and the 4 other great Johnsons for '49. All features are fully described.

JOHNSON SEA-HORSES
for DEPENDability

New Products

Rifle Safety Can't Forget....113
New Unit Heats Homes Better....130
Robot Takes Phone Messages....131
Multiple Hammer Nails Crates....144
Materials Wriggle Uphill....144
Plastic Quilted for Upholstery....172
Electricity Heats Oil Radiator....172
Bags Protect Clothes....194

Photography

Darkroom Fits Suitcase....131
Copying without a Camera....222

Mechanics & Shopwork

Converting Drill to Saw....194
Chasing Hammers from Old Valves....202
Turned Tray Has Ruffled Rim....208
Plastic Memory Creates New Forms....209
Cutting Corners....210
Chain Clamps Do Tough Glue Jobs....214
Tool Does Spot Polishing....215
Midget Soldering Iron....216
Finishing Your Narrow-Gauge Train....233
Portable Play Equipment....238
Chisel Rack Lets Chips Fall....246

Home Mechanics & Handicraft

Lawn Furniture from Staves....195
Chests from Orange Crates....196
Porringer Hammered Out of Aluminum..198
Plastic Pulls Give Modern Touch....199
Homemade Bass Bugs....204
Camp Clothesline Snaps On....207
Nail Set Removes Moldings....221
Baby Rides in Back Pack....232
Asbestos Insulates Exhaust....239
Building Your Own Screens....240
Wheel Measures Trails....243
Pharaoh's Serpent Eggs....245
Fix It with Rubber Tape....247
Garden Hose Prevents Rips....248

Radio & Electricity

Smallest Two-Way Radio....131
Recorder Is Miniature....131
Four-Way Portable....227

Departments

Letters 6
I'd Like to See Them Make.... 98
Voice of Science....103
Keeping the Home Shipshape....200
Craftsmen at Work....206
New Shop Ideas....218
New Tools....220
Photo Ideas and Equipment....224
What's Your Ingenuity Quotient?....226
News in Electronics....231
To: Reader—From: Editor....296

Copyrighted material

VETERAN'S CHOICE

More than 400 I. C. S. Courses are available to Veterans entitled to benefits under the G. I. Bill of Rights.

Here's your chance to start a program of Personal Advancement —through training. You select your own course, study in your spare time, progress as fast as your ability and ambition permit.

Each I. C. S. Course is a gateway to a profitable, exciting field. Each is practical, easy to understand.

The time for action is **now.** Remember, Veteran Training is a limited offer. For most Veterans, July 25, 1951, is the deadline. The time to get started is now! Mark and mail the coupon today! It brings full details on how to enroll.

INTERNATIONAL CORRESPONDENCE SCHOOLS

ICS

BOX 7629-M, SCRANTON 9, PENNA.

Without cost or obligation, please send me full particulars about the course BEFORE which I have marked X:

Business and Academic Courses
- ☐ Accounting ☐ Advertising
- ☐ Bookkeeping
- ☐ Business Administration
- ☐ Business Correspondence
- ☐ Certified Public Accounting
- ☐ Commercial
- ☐ Commercial Art
- ☐ Cost Accounting
- ☐ Federal Tax
- ☐ First Year College
- ☐ Foremanship ☐ French
- ☐ Good English ☐ High School
- ☐ Higher Mathematics
- ☐ Motor Traffic ☐ Postal Civil Service
- ☐ Retailing ☐ Retail Store Management
- ☐ Salesmanship ☐ Secretarial
- ☐ Sign Lettering
- ☐ Spanish ☐ Stenography
- ☐ Traffic Management

Air Conditioning and Plumbing Courses
- ☐ Air Conditioning
- ☐ Heating ☐ Plumbing
- ☐ Refrigeration ☐ Steam Fitting

Chemistry Courses
- ☐ Chemical Engineering
- ☐ Chemistry, Analytical
- ☐ Chemistry, Industrial
- ☐ Chemistry, Mfg. Iron & Steel
- ☐ Petroleum Refining ☐ Plastics
- ☐ Pulp and Paper Making

Civil Engineering, Architectural and Mining Courses
- ☐ Architecture
- ☐ Architectural Drafting
- ☐ Building Estimating
- ☐ Civil Engineering ☐ Coal Mining
- ☐ Contracting and Building
- ☐ Highway Engineering
- ☐ Lumber Dealer
- ☐ Reading Structural Blueprints
- ☐ Sanitary Engineering
- ☐ Structural Drafting
- ☐ Structural Engineering
- ☐ Surveying and Mapping

Communications Courses
- ☐ Electronics
- ☐ Practical Telephony
- ☐ Radio, General ☐ Radio Operating
- ☐ Radio Servicing
- ☐ Telegraph Engineering

Electrical Courses
- ☐ Electrical Drafting
- ☐ Electrical Engineering
- ☐ Electric Light and Power
- ☐ Lighting Technician
- ☐ Practical Electrician
- ☐ Power House Electric
- ☐ Ship Electrician

Internal Combustion Engines Courses
- ☐ Auto Technician ☐ Aviation
- ☐ Diesel-Electric
- ☐ Diesel Engines ☐ Gas Engines

Mechanical Courses
- ☐ Aeronautical Engineer's, Jr.
- ☐ Aircraft Drafting ☐ Flight Engineer
- ☐ Forging ☐ Foundry Work
- ☐ Heat Treatment of Metals
- ☐ Industrial Engineering
- ☐ Industrial Metallurgy
- ☐ Machine Shop
- ☐ Machine Shop Inspection
- ☐ Mechanical Drafting
- ☐ Mechanical Engineering
- ☐ Mold-Loft Work
- ☐ Patternmaking—Wood, Metal
- ☐ Reading Shop Blueprints
- ☐ Sheet-Metal Drafting
- ☐ Sheet-Metal Worker
- ☐ Ship Drafting ☐ Ship Fitting
- ☐ Tool Designing ☐ Toolmaking
- ☐ Welding Engineering
- ☐ Welding—Gas and Electric

Railroad Courses
- ☐ Air Brake ☐ Car Inspector
- ☐ Diesel Locomotive
- ☐ Locomotive Engineer
- ☐ Locomotive Fireman
- ☐ Locomotive Machinist
- ☐ Railroad Section Foreman

Steam Engineering Courses
- ☐ Boilermaking
- ☐ Combustion Engineering
- ☐ Engine Running
- ☐ Marine Engineering
- ☐ Steam Electric ☐ Steam Engineer

Textile Courses
- ☐ Cotton Manufacturing ☐ Loom Fixing
- ☐ Rayon Weaving ☐ Textile Designing
- ☐ Woolen Manufacturing

Name_____ Age_____ Home Address_____

City_____ State_____ Working Hours_____ A.M. to_____ P.M.

Present Position_____ Employed by_____

Length of Service in World War II_____

Enrollment under G.I. Bill and P.L. 16 approved for World War II Veterans. Special tuition rates to members of the Armed Forces. Canadian residents send coupon to International Correspondence Schools Canadian, Ltd., Montreal, Canada.

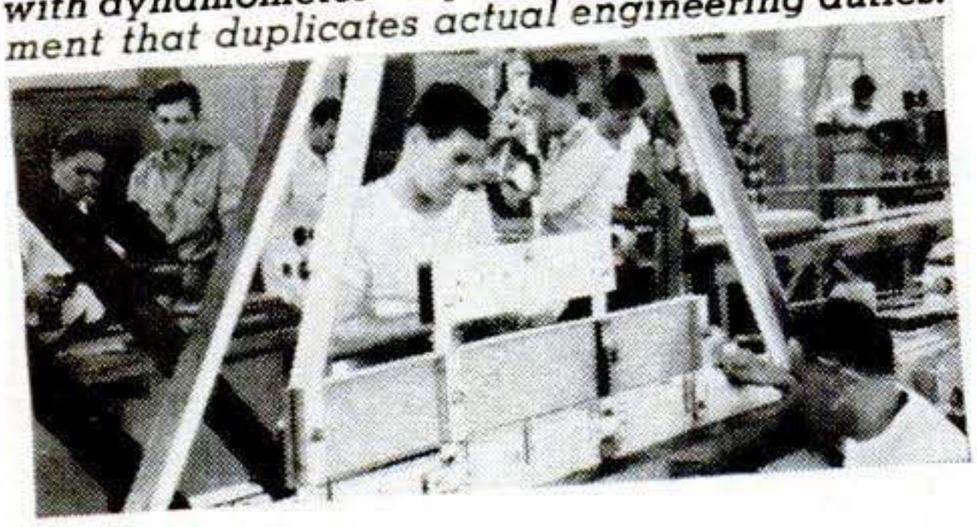
X THIS MARK BROUGHT INCOME. SEE CASE HISTORY ON PAGE 29

Copyrighted material

• Northrop engineering students in a huddle on design for rudder of student project aircraft—a scene to be repeated many times in their careers.

CREATIVE or PRACTICAL

• Making channel bending tests, measuring loads with dynamometer—a practical training assignment that duplicates actual engineering duties.



There's a *Big Future for You* in AERONAUTICAL ENGINEERING

▶ From drawing board through flight test, engineers of many different talents bring new aircraft into being. The choice of many *creative* duties, or of many *practical* kinds of work, is open to you in the interesting career field of Aeronautical Engineering.

▶ You have wide opportunities for specialization. Design, Aerodynamics, Structures, Stress Analysis, Hydraulics, Electronics, Power Plants . . . these are only a few of the fields *within* Aeronautical Engineering. Your rewards—in achievement and earnings—can be great. You can write your own ticket for the future.

▶ *Northrop* gives you the training it takes to grasp this big opportunity . . . training right in the midst of important research, development, engineering and manufacturing activities. Get complete information NOW.

Send Coupon for Catalog

Northrop Aeronautical Institute

Division of Northrop Aircraft, Inc.

James L. McKinley, Mng. Dir.

1525 E. Broadway, Hawthorne, Los Angeles County, Calif.

APPROVED FOR VETERANS

NORTHROP AERONAUTICAL INSTITUTE
1525 E. Broadway, Hawthorne, Los Angeles County, Calif.
Please send me the Institute catalog and complete information, including starting dates of classes. I am interested in:
☐ Aeronautical Engineering • Aircraft & Engine Mechanics ☐

Name Age

Address

City Zone State

Check one: ☐ Veteran ☐ Non-Veteran

Letters

Pardon, Your Tractor's Showing

Sir:

A picture on page 183 of your February issue shows an International Diesel TD-6 being loaded on a truck by the aid of the vanishing ramp (a wonderful idea).

You state that this tractor weighs nearly 18 tons, but a check on the TD-6 shows its weight to be approximately 7,300 lb.—a long way from 18 tons. Try TD-24.

C. I. Iams

Canton, Ohio

Reader Iams is one of 39 readers who have brought this slip to our attention—which shows that PS readers know their tractors. A TD-24, which does weigh nearly 18 tons, did go up the ramp, but unfortunately the only available picture of the ramp in use showed the much smaller TD-6, and the error was not caught in time.

Jeep Turns Corners

Sir:

On page 124 of the Feb. issue of Popular Science you had an article about a jeep that carries its own road along with it. This idea looks like it ought to work swell. But what happens when the jeep wants to turn a corner?

Dale Wilson

Sterling, Kansas

The jeep can not only turn, reports the Marine Corps, but with an experienced driver can be handled easily even in city streets, although its turning radius is about 75 feet. Its steering gear is connected to a rod on the front bumper that shifts the mat to the left or right as the wheels are turned. In addition, the mat's flexibility permits it to bend slightly in the direction of the turn.

Rubber Nozzle Stops Static

Sir:

I note with considerable interest the article on the "Gas Nozzle Made of Rubber" on page 169 of your November issue.

It occurs to me that it has always been considered necessary to have a metal nozzle,

Copyrighted material

AUDELS CARPENTERS & BUILDERS GUIDES—(4 Book Set).....$6

A practical illustrated trade assistant on modern construction for carpenters, joiners, builders, mechanics and all woodworkers. 4 vols., 1600 pages, 3700 illustrations. Fully indexed, flexible covers. Each volume sold separately $1.50 a vol.

AUDELS PLUMBERS & STEAMFITTERS GUIDES—(4 Book Set).....$6

A Practical Trade Assistant & Ready Reference. Explains in plain language & by clear illustrations, diagrams, charts, graphs, pictures principles of modern plumbing practice including Marine Pipe Fitting and Air Conditioning. 4 Vols.—1670 Pages—3642 Diagrams & Illustrations. Each Vol. Sold Separately $1.50 a Vol.

AUDELS OIL BURNER GUIDE.....$1

384 Pages Covering Installation, Servicing & Repairs All Types Domestic & Industrial Burners. Illustrated. Highly Endorsed.

AUDELS HOUSE HEATING GUIDE..$4

1000 Pages Covering Working Principles, Installation, Service of All Modern House Heating, Ventilating & Air Conditioning Systems. Explains New Radiant Heating. Fully Illustrated & Indexed.

AUDELS REFRIGERATION & AIR CONDITIONING GUIDE.....$4

New from Cover to Cover—1280 Pages, Fully Illus. Covering basic principles, servicing, operation & repair of household, commercial & industrial refrigeration & air conditioning. A gold mine of essential important facts for engineers, servicemen, users.

AUDELS SHEETMETAL WORKERS HANDY BOOK.....$1

Practical inside information. Fundamentals of Sheet Metal Work. 388 pages. Illustrated. 11 sections. Clearly written. Essential & important facts, figures, pointers in everyday language. Ref. Index.

AUDELS SHEETMETAL PATTERN LAYOUTS $4

Developed by Experts for Sheet Metal Workers, Layout Men & Mechanics. A Practical Encyclopedia in 10 Sections, size 7 x 10 x 2—1125 Pages—350 Layouts—1600 Illustrations. 1001 Key Facts. Fully indexed for ready reference in answering your layout problems. Covers all phases of sheet metal work including Pattern Cutting, Pattern Development & Shop Procedure.

AUDELS BLUE PRINT READING.....$2

For Mechanics & Builders. Covers all types of blue print reading including ship & airplane. 416 pages, fully illustrated.

AUDELS MATHEMATICS & CALCULATIONS FOR MECHANICS $2

Mathematics for home study or reference. 700 pages, 550 illus. Practical mathematics from beginning. How to figure correctly. Easy, correct methods covering complete review. Illus. & Indexed.

AUDELS AUTOMOBILE GUIDE.....$4

A practical quick ready reference book for auto mechanics, service men, operators & owners. Explains theory, construction & servicing of modern motor cars, trucks, buses & auto type Diesel engines. 1700 pages, fully illustrated. 55 chapters. Indexed. A standard book for mechanics. New Hydraulic drive covered.

AUDELS DIESEL ENGINE MANUAL....$2

A practical, concise treatise with questions and answers on the theory, operation and maintenance of modern diesel engines. Over 400 pages, fully illus. All details plainly brought out, this book is of extreme value to engineers, operators & students.

AUDELS WELDERS GUIDE.....$1

A concise, practical text on operation & maintenance of all welding machines for all mechanics. Over 400 pages, illustrated. Covers all methods of electric and acetylene welding including airplane work.

AUDELS MACHINIST & TOOLMAKERS HANDY BOOK $4

Covers modern machine shop practice in all its branches. Tells how to set up & operate lathes, screw and milling machines, shapers, drill presses & all other machine & hand tools. 1600 pages, fully illustrated. Indexed. 5 sections. 1—Modern Machine Shop Practice. 2—Blue Print Reading & How to Draw. 3—Calculations & Mathematics for Machinists. 4—Shop Physics. 5—How to Use the Slide Rule. 60 chapters. Easy to read and understand. A shop companion that answers your questions.

AUDELS ELECTRIC MOTOR GUIDE $4

Practical Information Covering Construction, Control, Maintenance & Wiring Hookups of All Types Electric Motors also Armature Winding. 1000 Pages Fully Illustrated & Indexed.

AUDELS ELEC. WIRING DIAGRAMS $1

210 Pages. Illustrated. Gives practical facts on wiring of electrical apparatus. It shows clearly how to wire apparatus for practically all fields of electricity. Each diagram is complete & self-explanatory. Highly Endorsed Pocket Companion.

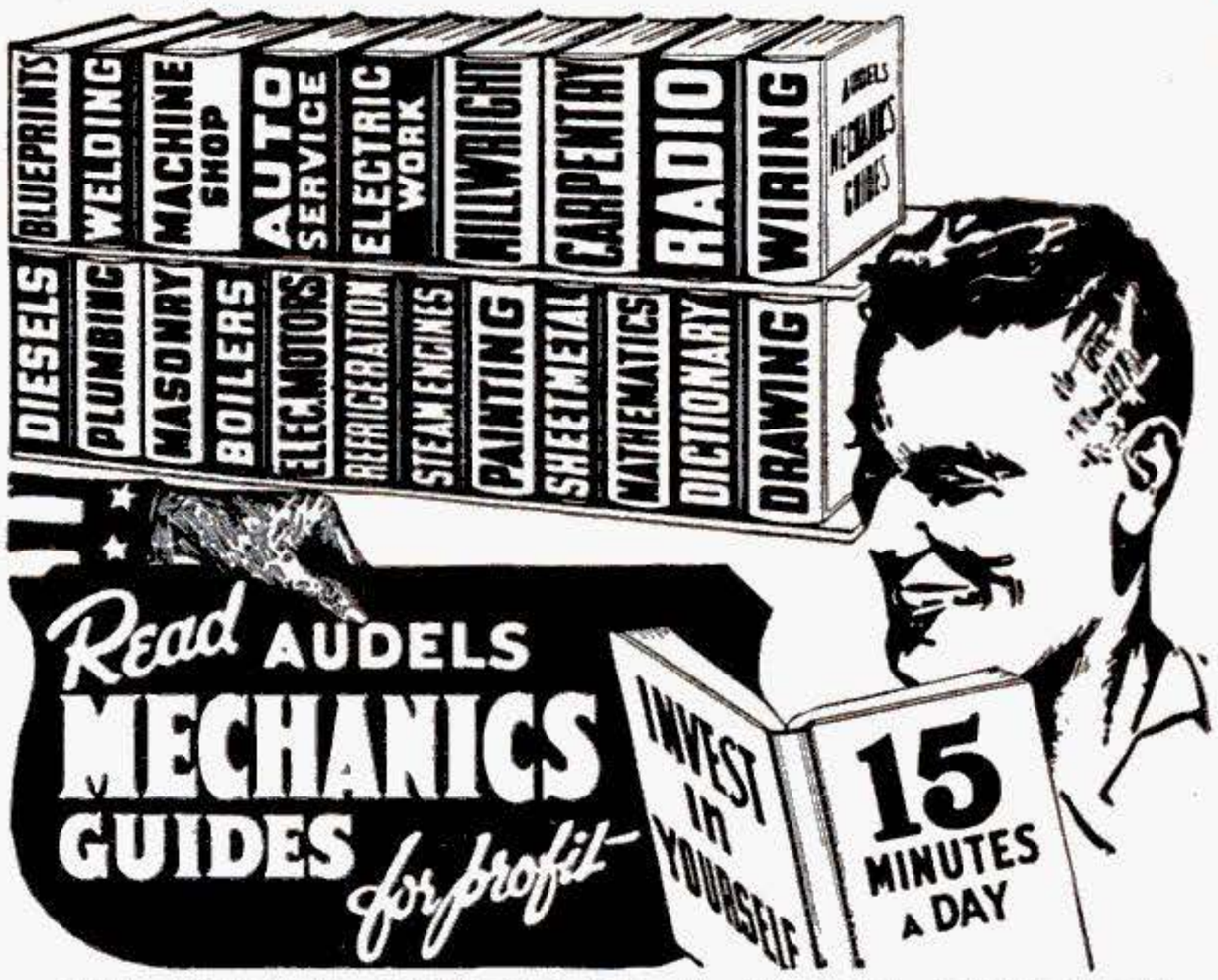
AUDELS PRACTICAL ELECTRICITY $4

A key to a practical understanding of Electricity. For maintenance engineers, electricians & all electrical workers. 1440 Pages, 2600 Illus. Covers important electrical information in handy form—including wiring for Light & Power. Indexed.

AUDELS RADIOMANS GUIDE $4

A key to the practical understanding of radio including Frequency Modulation, Television, etc., Aircraft & Marine Radio. For radio engineers, servicemen, amateurs, 914 Pages, 633 Illustrations & Diagrams. Photos. Review Questions & Answers, Reference Index.

AUDEL, Publishers, 49 W. 23 St., N.Y. 10



AN AUDEL GUIDE IS A GOOD FRIEND!

Step Up Your Own Skill with the Practical Facts and Figures of Your Trade. Save time and money with right methods, short cuts, labor saving ideas. CHECK NOW! You can look over any Audel Guide in your home. Start the Easy Payments if satisfied.

CUT HERE

MAIL ORDER

AUDEL, Publishers, 49 W. 23 St., New York 10, N. Y.

Please mail me for 7 days' free examination the books marked (X) below. I agree to mail $1 in 7 days on each book or set ordered, and to further mail $1 a month on each book or set ordered until I have paid the purchase price. If I am not satisfied with Guides I will return them.

- ☐ AUTOMOBILE GUIDE, 1700 Pages $4
- ☐ DIESEL ENGINE MANUAL, 400 Pages 2
- ☐ WELDERS GUIDE, 400 Pages 1
- ☐ CARPENTERS & Builders Guides (4 Book Set) . . . 6
- ☐ PLUMBERS & Steamfitters Guides (4 Book Set) . . 6
- ☐ MASONS and Builders Guides (4 Book Set) 6
- ☐ BLUE PRINT READING, 416 Pages 2
- ☐ MASTER PAINTER & Decorator, 320 Pages 2
- ☐ GARDENERS & GROWERS GUIDES (4 Book Set). . 6
- ☐ OIL BURNER GUIDE, 384 Pages 1
- ☐ HOUSE HEATING GUIDE, 1000 Pages 4
- ☐ REFRIGERATION & Air Conditioning Guide, 1280 Pages 4
- ☐ SHEET METAL WORKERS Handy Book, 388 Pages . 1
- ☐ SHEET METAL PATTERN LAYOUTS, 1100 Pages . . 4
- ☐ AIRCRAFT WORKER, 240 Pages 1
- ☐ MECHANICAL DRAWING GUIDE, 160 Pages . . . 1
- ☐ MECHANICAL DRAWING & DESIGN, 480 Pages . . 2
- ☐ MATHEMATICS and CALCULATIONS, 700 Pages . . 2
- ☐ MECHANICAL DICTIONARY, 968 Pages 4
- ☐ MACHINISTS & Toolmakers Handy Book, 1600 Pages. 4
- ☐ MILLWRIGHTS & Mechanics Guide, 1200 Pages . . 4
- ☐ POWER PLANT ENGINEERS GUIDE, 1500 Pages . . 4
- ☐ ENGINEERS & FIREMANS EXAMINATIONS, 528 Pages 1
- ☐ PUMPS, HYDRAULICS & Air Compressors, 1658 Pages 4
- ☐ MARINE ENGINEERS Handy Book, 1280 Pages. . . 4
- ☐ ENGINEERS and Mechanics Guides (8 Book Set) . . 12
- ☐ Answers on Practical ENGINEERING, 254 Pages . . 1
- ☐ ELECTRIC WIRING DIAGRAMS, 210 Pages. . . . 1
- ☐ ELECTRICIANS EXAMINATIONS, 250 Pages . . . 1
- ☐ ELECTRIC DICTIONARY, 9000 Terms 2
- ☐ ELECTRIC MOTOR GUIDE, 1000 Pages 4
- ☐ PRACTICAL ELECTRICITY Handy Book, 1440 Pages. 4
- ☐ ELECTRICAL POWER CALCULATIONS, 425 Pages . 2
- ☐ RADIOMANS GUIDE, 914 Pages. 4
- ☐ ELECTRONIC DEVICES, 216 Pages. 2
- ☐ NEW ELECTRIC LIBRARY, 7000 Pages (12 Book Set). 18

Vols. I, II, III, IV, V, VI, VII, VIII, IX, X, XI, XII—$1.50 Each

*Name*_____

*Addres*_____

*Occupation*_____

*Employed by*_____ PSM

You Can Influence Others With Your Thinking

TRY IT SOME TIME. Concentrate intently upon another person seated in a room with you, without his noticing it. Observe him gradually become restless and finally turn and look in your direction. Simple—yet it is a *positive demonstration* that thought generates a mental energy which can be projected from your mind to the consciousness of another. Do you realize how much of your success and happiness in life depend upon your influencing others? Is it not important to you to have others understand your point of view — to be receptive to your proposals?

How many times have you wished there were some way you could impress another favorably — *get across to him or her your ideas?* That thoughts can be transmitted, received, and understood by others is *now* scientifically demonstrable.

This FREE Book Points the Way

The tales of miraculous accomplishments of mind by the ancients are now known to be fact—not fable. The method whereby these things can be INTENTIONALLY, not accidentally, accomplished has been a secret long cherished by the Rosicrucians—one of the schools of ancient wisdom existing throughout the world. Write for the free copy of the fascinating sealed book, "THE MASTERY OF LIFE," which explains how you may receive this unique wisdom and benefit by its application. Address: Scribe H.W.W.

The ROSICRUCIANS
San Jose, (AMORC) California

USE THIS COUPON

Scribe H.W.W.
The Rosicrucians
San Jose, California

I am sincerely interested in an intelligent method of attaining a mastership of life. Send me without obligation, your FREE Book which explains how I may receive and use your age-old method.

Name.....
Address.....
City.....

and to make certain it is in contact with the car's inlet pipe before gasoline flows to prevent any static discharge from striking between the gasoline in the hose and the car's inlet pipe.

What's happened, Mr. Editor? Has theory been changed, or is static electricity behaving differently these days?

E. S. READ

General Electric Co.
Syracuse, N. Y.

Last seen, static electricity was behaving about the same as always, but the new B. F. Goodrich rubber nozzle has a special type of carbon black mixed into the compound that gives the rubber a high degree of electrical conductivity. Thus, by equalizing any differences in the static-electrical potential between the hose and the car's inlet pipe, the rubber nozzle prevents sparks from jumping between the two in the same way that the metal nozzle does.

A Few Kind Words

Sir:

Each month I read with interest the Letters to the Editor as they appear and the unusual way in which they are answered. As long as I have been reading this helpful publication, I cannot ever remember reading a letter of praise for the information which you present each month. Instead of commending the good work which your staff provides, most people seem to be contented to merely criticize the relatively few mistakes which are made. After all, it is only human to make a small mistake occasionally.

I personally wish to thank you and your capable staff for providing numberless hours of helpful and interesting reading matter which is quite apropos in this scientific age.

FRANK S. GRIBBLE

Mars Hill, N. C.

PS appreciates the many letters of praise it regularly receives, but feels that the "Letters" column should mostly be devoted to answering as many of its readers' questions as possible. Since space is short, the letters of praise, as much as we love 'em, often get crowded out.

Flap Keeps PS Fresh

Sir:

Here's a neat trick I learned to keep my

Copyrighted material

Accountancy Home-Study

made *interesting* and *practical* thru *problem method*

YOU know as well as we do that Accountancy fits many men for positions that pay three and five and ten thousand dollars a year—gives many other men unusual opportunity to start a profitable growing business of their own.

You probably realize also that the accounting profession faces the greatest opportunity it has ever had.

The only question is—just how practical is it for *you* to train yourself adequately in Accountancy through home study?

And the answer lies in the LaSalle Problem Method.

For this modern plan of training not only makes Accountancy study at home thoroughly practical but makes it interesting as well.

And here's how:

You Learn by Doing

Suppose it were your privilege every day to sit in conference with the auditor of your company or the head of a successful accounting firm. Suppose every day he were to lay before you in systematic order the various problems he is compelled to solve, and were to explain to you the principles by which he solves them. Suppose that one by one you were to work those problems out—returning to him every day for counsel and assistance—

Granted that privilege, surely your advancement would be far faster than that of the man who is compelled to pick up his knowledge by study of theory alone.

Under the LaSalle Problem Method you pursue, to all intents and purposes, that identical plan. You advance by solving problems.

Only—instead of having at your command the counsel of a single individual—one accountant—you have back of you the organized experience of a great business training institution, the authoritative findings of scores of able accounting specialists, the actual procedure of the most successful accountants.

Thus—instead of fumbling and blundering—you are coached in the solving of the very problems you must face in the higher accounting positions or in an accounting practice of your own. Step by step, you work them out for yourself—until, at the end of your training, you have the kind of ability and experience for which business is willing and glad to pay real money.

One-Tenth of All C.P.A.'s Are LaSalle Trained

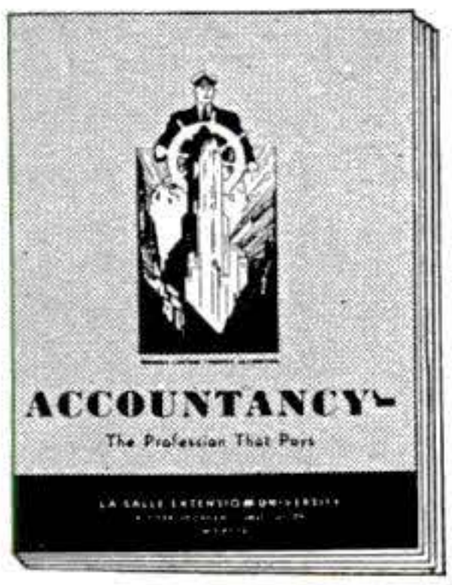
If you want still more proof, remember that over 2800 C.P.A.'s—approximately one-tenth of all those in the United States who have passed the difficult examination for this coveted degree—are LaSalle alumni.

And knowing these facts, ask yourself if there can be any further question about the practicability of this training for you—ask rather if the real question is not about the size of your own ambition and the quality of your determination.

For Accountancy is no magic wand for the lazy or the fearful or the quitter—it offers success only to the alert adult who has the courage to face the facts and the will to carry on till the job is done.

If you are that individual, the coupon below, filled out and mailed, will bring you free the information that may open up to you the future of which you have dreamed—ability and income and success. Is it not worth getting that information?

LASALLE EXTENSION UNIVERSITY
A Correspondence Institution
CHICAGO 5, ILLINOIS



LaSalle Extension University

Dept. 583-HR 417 S. Dearborn St., Chicago 5, Ill.

Please send me, free of all cost or obligation, your 48-page illustrated book "Accountancy, the Profession That Pays," telling about the profession of accountancy and your training for success in that field—also "Ten Years' Promotion in One"—a book which has helped many men.

Name..... *Age*.....

Address.....

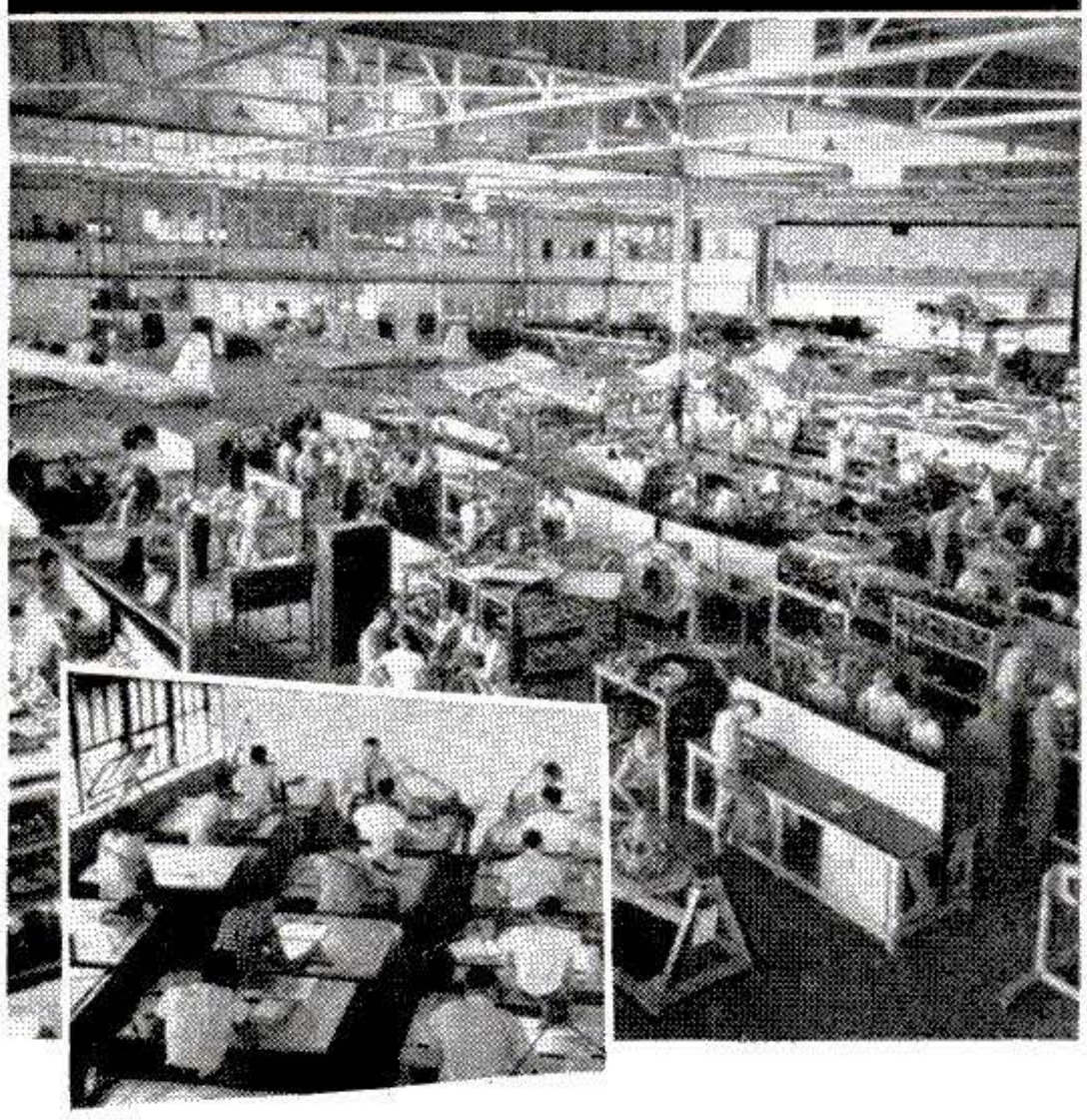
City, Zone, State.....

Other LaSalle Opportunities

- ☐ C.P.A. Coaching
- ☐ Bookkeeping
- ☐ Law: LL.B. Degree
- ☐ Business Management
- ☐ Salesmanship
- ☐ Traffic Management
- ☐ Foremanship
- ☐ Industrial Management
- ☐ Stenotypy (Machine Shorthand)

Copyrighted material

Embry Riddle begins Your
Aviation Career



Your Success in Aviation begins with *thorough, practical* Embry-Riddle training. Engineering and mechanic students work on *live* aircraft in *airline* size hangars... study design in spacious, well-lighted classrooms. Flight students train in the most modern aircraft...,fly year-round in Miami's perfect flying weather. And at world-famous Embry-Riddle you live amidst the international hustle and bustle of the world's greatest air center.

Never has there been such opportunity for you in Aviation. The demand for *trained* men far exceeds the supply. Embry-Riddle prepares you in a few short months for all fundamental flight, engineering and mechanic positions, including the new, wide field for *combination ability* (pilot *plus* mechanic certification). Take advantage of the magnificent training facilities at vast Opa-locka Airport, operated entirely by Embry-Riddle. Study under the best instructors...backed by Embry-Riddle's quarter-century of aviation training experience. Live directly on the Airport. Enjoy Florida's matchless climate year-round, its wealth of sport and recreational facilities. Start your Aviation Career NOW at Embry-Riddle.

Send coupon today for new catalog and proof of career opportunities for Embry-Riddle graduates.

AUTHORIZED G. I. TRAINING

Dean of Enrollments - Dept. 91
Embry-Riddle School of Aviation
Miami 30, Florida

Please Print

NAME _____

ADDRESS _____

City _____

State _____ Age ____

I am interested in...

- ☐ A.&E. Mechanic
- ☐ Commercial Pilot
- ☐ Engineering
- ☐ A.&E. Combined with Commercial Pilot
- ☐ Flying Mechanic
- ☐ Drafting & Design

Check One { ☐ Veteran ☐ Non-Veteran

TRAIN IN MIAMI -- AIR CAPITAL OF THE WORLD

back issues of PS as fresh as the day I bought them.

Simply fold the flap often found on the back cover so that it conforms to the thickness of the magazine.

This forms a protective shield, or cover, for the corners of the pages. . . .

ROBERT O. PETRIE

Oswego, N. Y.

Doubting Thomas

Sir:

Re "What the Cleaner Does to Your Suit," PS March '49—somehow I feel they don't do all this to *my* suit.

THOMAS PINCH

Washington, D. C.

Sports-Car Speedster

Sir:

I was very pleased to see some pictures of sports cars in the March edition of your magazine [p. 186], and I hope you will continue to publish descriptions of sports cars and their achievements.

There is one point I would like verified, however. You say that the B.M.W. averaged 104 m.p.h. in the 1940 Mille Miglia. This speed seems to me to be about 20% on the high side, taking into consideration that, on some sections of the road, to maintain an average of over 50 m.p.h. takes a lot of driving. (Twice crossing the mountains). If my memory serves me right in 1934 the winning speed was just under 71 m.p.h.

S. CHLUSEWICZ

Hamilton, Ontario, Canada

In a paper delivered before the Society of Automotive Engineers at French Lick, Ind., in June, 1947, Laurence Pomeroy, technical editor of "The Motor" in London, said that the B.M.W. "has a maximum speed in excess of 120 m.p.h." and that it had traveled "1,000 miles on an Italian road circuit at an average speed of 104 m.p.h." This race was the 1940 Mille Miglia to which PS referred.

Battle of the Train Light

Sir:

Were I a railroad engineer, I would hate to rely on the train light shown on p. 122 of the February issue of POPULAR SCIENCE.

Since railroad curves are banked to

Copyrighted material

Holds Government Job with Civil Service Rating

"Hold Radio telegraph 2nd Class License with Radio telephone 1st Class endorsement. Now with Civil Service, rating as P-4."—OTIS L. WRIGHT, Albuquerque, N. M.

Made $10 a Week in Spare Time While Training

"Before graduating, I averaged $10 a week in spare time. After graduating I managed electrical store Radio department."—MANUEL JOSEPH, Sacramento, Calif.

Has Job of Chief Engineer at Station WORD

"Am Chief Engineer of Station WORD, in charge of 4 men. Owe all I know about Radio to N.R.I."—CLYDE J. BURDETTE, Spartanburg, S. C.

Pay Jumped $2000 A Year Since NRI Course

"Am Chief Engineer of WDOD. Before that was wireless operator on ship. Salary increased $2,000 a year since entering Radio."—JULIUS C. VESSELS, Chattanooga, Tenn.

Earns Cash in Spare Time to Pay for Course

"Earned enough spare time cash to pay for my course by time I graduated. N.R.I. training is tops!"—ALEXANDER KISH, Carteret, N. J.

Becomes Operator at Police Radio Station WASP

"When I enrolled, had no idea of entering commercial Radio. Am now Operator, Police Radio Stations WASP a[illegible]KSJ."—GORDO[illegible]US, Selma[illegible]

Has His Own Spare Time Radio Business

"Work only spare time at Radio and average about $50 a month. Knew nothing about Radio before enrolling. Recommend N.R.I. to anyone."—SAMUEL T. DeWALD, St. Clair, Pa.

Gets Job with Radio-Television Manufacturer

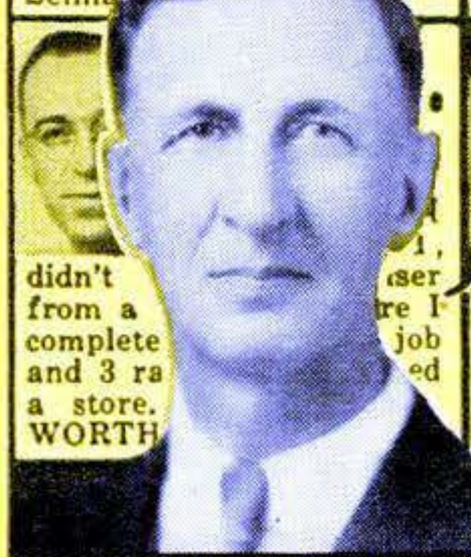
"Most profitable investment I ever made. Went to work for Philco in their Radio laboratory. Constructed, maintained sets."—SAUL [illegible]

Now Boss of Own Money-Making Radio Shop

"Now have two Radio Shops servicing about 200 sets a month. Have largest Radio Servi[illegible]

Specializes in Marine Radio Installations

"Have been in several branches of Radio since [illegible] N.R.I. course [illegible]. Now spe[illegible]rine Radio [illegible] MURRAY [illegible]ucah, Ky.



didn't [illegible] from a [illegible] complete [illegible] and 3 ra[illegible] a store. WORTH[illegible]

[illegible]s FCC [illegible]nse and [illegible]as Broad-[illegible] Engineer

[illegible]ore com-[illegible]eting [illegible]cense as [illegible]operator. [illegible] WMPC. [illegible] Engineer of station."—HOLLIS F. HAYES, Lapeer, Mich.

I TRAINED THESE MEN FOR GOOD PAY - SUCCESS A BRIGHT FUTURE!

J. E. SMITH, President
National Radio Institute

I WILL TRAIN YOU AT HOME FOR RADIO-TELEVISION

You Practice Servicing or Communications with MANY KITS

Want a good-pay job in the fast-growing RADIO-TELEVISION Industry? Want a money-making Radio-Television shop of your own? Here's your opportunity. I've trained hundreds of men to be successful Technicians—MEN WITH NO PREVIOUS EXPERIENCE. My tested and proved train-at-home method makes learning easy. You learn Radio-Television principles from illustrated lessons. You get practical experience building, testing, experimenting with MANY KITS OF PARTS I send. All equipment yours to keep.

MAKE EXTRA MONEY IN SPARE TIME

The day you enroll, I start sending SPECIAL BOOKLETS that show you how to make $5, $10 a week or more EXTRA MONEY fixing neighbors' Radios in spare time while learning. From here, it's a short step to your own shop or a good-pay Radio-Television servicing job. Or be a licensed Radio-Television Operator or Technician. Today there are nearly 2700 Broadcasting stations on the air—and within three years, experts predict there will be over 1000 Television stations. Then add developments in FM, Two-Way Radio, Police, Marine, Aviation and Micro-Wave Relay Radio! Think what this means. New jobs, more jobs, good pay for qualified men.

MAIL COUPON FOR BOOKS FREE

Act now! Coupon entitles you to actual lesson, "GETTING ACQUAINTED WITH RECEIVER SERVICING." You also get my 64-page book, "HOW TO BE A SUCCESS IN RADIO-TELEVISION." Both FREE. See what my graduates are doing and earning. Send coupon in envelope or paste on penny postal. J. E. SMITH, President, Dept. 9EP3, National Radio Institute, Pioneer Home Study Radio School, Washington 9, D. C.

America's Fastest-Growing Industry

You Build This Radio

As part of my Servicing Course, I send you speaker, tubes, chassis, transformer, ALL you need to build this modern Radio that brings in local and distant stations. Use it to conduct tests and practice servicing. It's yours to keep.

You Build This Transmitter

As part of my New Communications Course, I send you parts to build your own low-power broadcasting Transmitter. Shows you how to put a station "on the air." You perform actual procedures demanded of Broadcast Station operators, make many practical tests. It's yours to keep.

MAIL NOW

Good for Both-FREE

MR. J. E. SMITH, President, Dept. 9EP3,
National Radio Institute, Washington 9, D. C.

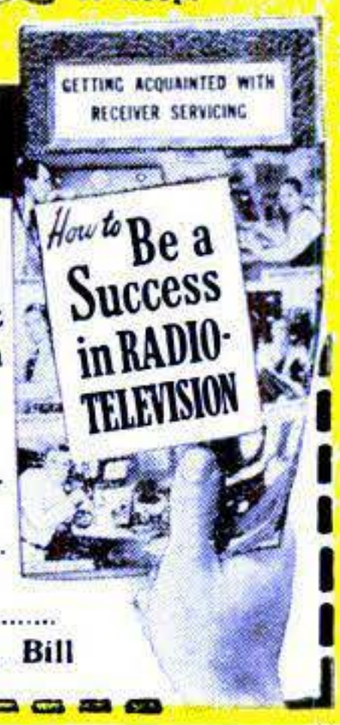
Mail me Sample Lesson and 64-page Book about How to Win Success in Radio-Television—both FREE. (No salesman will call. Please write plainly.)

Name.....Age.....

Address.....

City.....Zone.....State.....

☐ Check if Veteran Approved Under G. I. Bill



VETERANS GET THIS TRAINING WITHOUT COST UNDER G. I. BILL. MAIL COUPON.

Copyrighted material

OWN YOUR BUSINESS

Start in Spare Time with a

FOLEY SAW FILER

Here is a steady repeat CASH business you can start at home in your basement or garage, while you are working at your regular job. No experience is necessary to turn out perfect cutting saws —"the first saw I sharpened came out 100%. I think the Foley Saw Filer is a marvel of perfection," writes C.E.P. Every saw you sharpen will bring you new customers. You will find you can make up to $2 or $3 an hour—$20 to $30 a week in your spare time as a starter.

With a Foley Saw Filer you can file all hand saws, also band and cross-cut circular saws. It is easy to operate—simple adjustments—no eyestrain. Patented jointing principle evens up all irregular teeth and makes an old saw cut just like new.

This Free Book Shows How to Start

"INDEPENDENCE AFTER 40!"

shows you how to get plenty of saws to file without canvassing, and how you can develop into a general repair shop that will be your own business. This is a helpful, practical book that tells just what to do—send for your free copy today.

Send For FREE BOOK

FOLEY MFG. CO., 519-9 Foley Bldg., Minneapolis 18, Minn.

Send me free book "INDEPENDENCE AFTER 40!"

Name.....

Address.....

neutralize centrifugal force acting on a train, each curve is banked for a designated speed. The only time the light would work as designed would be when the train is traveling slower than the designated speed of the curve it is on. When the train is traveling at the designated speed, the pendulum would remain in the same position with respect to the train, and the light would point straight ahead, as any fixed light would do. At speeds above the designated speed, the pendulum would be pulled outward and the light would actually point farther away from the track. A study of the vector forces acting on the pendulum should show you that this is true.

DAVID PESZNECKER

Seattle, Wash.

Mr. William Le Clair, inventor of the locomotive headlight, answers Mr. Peszznecker in the letter that follows:

Sir:

. . . I'll try to make clear how it is possible for the pendulum to turn a headlight on a locomotive negotiating a curve. The center of gravity of the locomotive moving forward is at the wheel base. If the gravity center were above the locomotive, there would be no need of banking road beds on curves. Now there is a dividing line between where centrifugal force begins and where gravity leaves off. Were a 1-pound weight supported six inches below the center of gravity, it would remain perpendicular to its axis up to a given speed, but if that given speed were exceeded, the arm supporting the weight would have to be lengthened to maintain the weight in a vertical position. I think the above covers the question.

WILLIAM LE CLAIR

Martinsdale, Mont.

After checking with several physicists, PS is forced to give the nod to Mr. Peszznecker —and a number of other readers—who correctly point out that the pendulum would be subject to the same centrifugal force as the train. At slow speeds, the pendulum would remain close to vertical, but at the speed for which the curve was banked it would swing outward and thus fail to turn the headlight. If the pendulum didn't swing outward on a curve, neither would anything else, and there'd be no need to bank the track. PS was so interested in the idea that this point was overlooked.

Copyrighted material

Copyrighted material

How to Make YOUR Body Bring You FAME

Instead of SHAME!

Will You Let Me Prove I Can Make You a New Man?

I KNOW what it means to have a body that people pity! I was once a skinny, 97-lb. weakling—such a poor specimen that I was constantly self-conscious, embarrassed. But later I discovered the secret that turned me into the holder of the title, "The World's Most Perfectly Developed Man." I'd like to prove that the same system can make a NEW MAN of YOU!

Charles Atlas

This is an actual snapshot taken at the beach.

7 DAY TRIAL OFFER

I don't say I can do all this for you in 7 days. But I DO want to prove I can show you enough results in even THAT short time to convince you that my system of *"Dynamic Tension"* will give you the kind of body you have always longed to have!

Do you want powerful shoulders—a fine, deep chest—biceps like iron—arms and legs rippling with strength—a stomach ridged with sinewy muscle—a build to be proud of? Then let me prove that *"Dynamic Tension"* is what you need.

FREE BOOK It costs only a stamp — or a postcard—to mail coupon below. I'll send my new, free book, "Everlasting Health and Strength." It tells about my *"Dynamic Tension"* method; shows, from actual photos, how I have developed my pupils—explains about my 7 DAY TRIAL OFFER. Charles Atlas, Dept. 1S, 115 East 23rd St., New York 10, N.Y.

Mail Coupon Now for FREE Book

CHARLES ATLAS, Dept. 1E,
115 East 23rd Street, New York 10, N. Y.

I want the proof that *"DYNAMIC TENSION"* will help make a new man of me—give me a healthy, husky body and big muscle development. Send me your free book, "Everlasting Health and Strength."

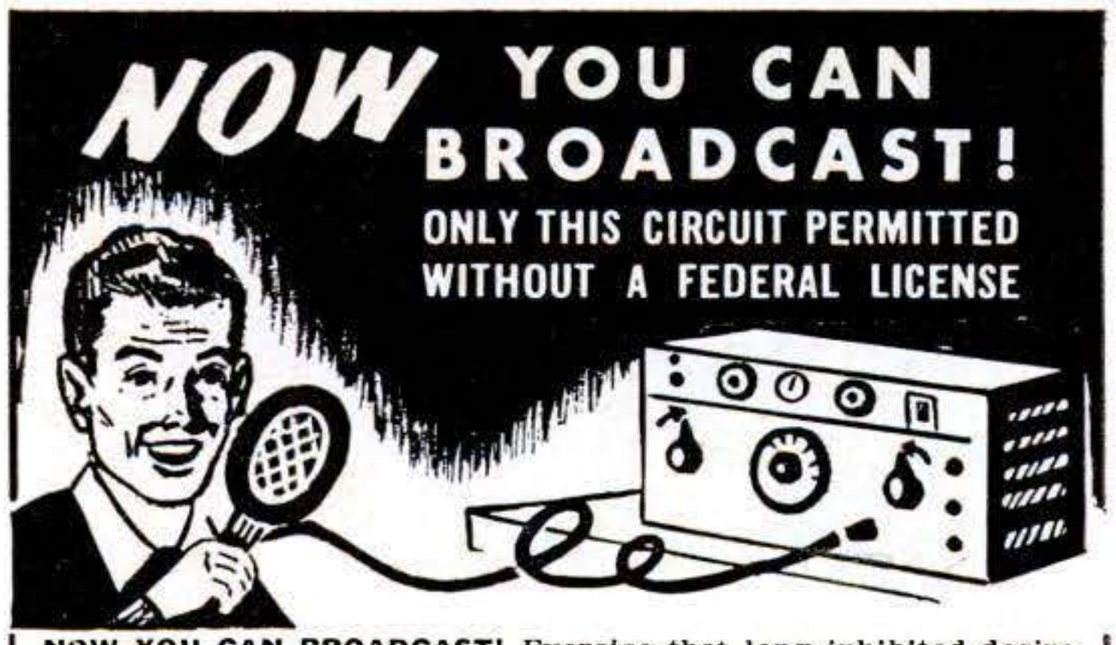
Name ..... Age.....
(Please print or write plainly)

Address .....

City ..... State.....

NOW YOU CAN BROADCAST!

ONLY THIS CIRCUIT PERMITTED WITHOUT A FEDERAL LICENSE



NOW YOU CAN BROADCAST! Exercise that long inhibited desire to get behind your own "mike" and talk! **NOW YOU CAN DO IT!**

NO LICENSE OR TEST REQUIRED OF ANY KIND

Use a microphone or key any place in the U.S.A. Make new friends by radio . . . enjoy the thrill of transmitting your thoughts to others!

PACIFIC ELECTRONICS has perfected 5 circuits that may be used for transmitting radio frequency currents under FCC rules and regulations. *Only this type of radiation permitted without a license* . . . do not attempt to broadcast without this information! **Severe penalties involved!**

Regardless what you may have heard or read to the contrary, we **GUARANTEE** that our circuits may be used for transmission of CW or modulated radio frequency currents **WITHOUT A LICENSE OF ANY KIND!** Or money refunded **IN FULL!**

THIS IS NOT A TOY, NOT A GADGET, NOT A PHONOGRAPH ATTACHMENT, NOT AN INTER-COMM . . . this is as close to the real thing as you can possibly get **WITHOUT** a Federal License!

SEND TODAY for complete **BLUE-PRINTS,** data, rules and regulations covering this type of broadcasting. **Complete price postpaid** **$1.50**

PACIFIC ELECTRONICS
P. O. BOX 212 (Dept. B) PALO ALTO, CALIF.

LOCKSMITHING & Key Making

PRACTICAL UP-TO-DATE COURSE

Easy-to-learn modern information for self-instruction. How to work on locks, pick locks, de-code, make master-keys, repair, install, service, etc. For every handyman, home owner, carpenter, mechanic, service station operator, fix-it shop, hardware dealer, gunsmith. 53 plain illustrated lessons. Full price only $3.95. SEND NO MONEY. Just pay postman plus C.O.D. postage. Or send $3.95 with order, we'll ship postpaid. Satisfaction guaranteed or refund. Address below.

WATCH & CLOCK REPAIRING

Learn at Home in Your Spare Time! . . . Prepare for a happy future, with security—and qualify for a good job NOW. A fascinating and thorough self-instruction training in American and Swiss watches and clocks. Special section on alarm clock repairs. Fast-growing field. Satisfaction is guaranteed. Full price only $4.95, postpaid—or COD plus postage.

Nelson-Hall Co., 1139 S. Wabash Ave., Dept. E-1, Chicago 5, Ill.

REPAIR PARTS

START YOUR OWN WASHING MACHINE REPAIR BUSINESS

Tremendous field, excellent profits! Get our large complete wholesale catalogue showing thousands of repair parts illustrations: wringer rolls, V-belts, motors, gears, etc. Price $1.75 per copy postpaid in U. S. Send check or money order today—price of catalogue refunded on first order.

Established 20 Years

WESTERN APPLIANCE CO., Inc.
5650 Grand River Ave., Detroit 8, Mich.

NATION'S LARGEST EXCLUSIVE ELECTRICAL SCHOOL

"LEARN-BY-DOING"

ELECTRICITY

PRACTICAL TRAINING NOT "HOME STUDY"

G.I. APPROVED Get actual experience in great shops of M.T.I. Learn all phases Practical Electricity; Housewiring, Motors, Const., Maintenance, etc. Living arrangements, Part-time jobs, etc.

Send coupon TODAY.

MICHIGAN TECHNICAL INSTITUTE ☐ Veteran
2281 W. Fort St., Detroit, Mich., Dept. PS-5

Name _____

Street _____

City _____ State _____

Copyrighted material

INVENTORS

Learn how to protect your invention. The U. S. Patent Laws provide that any new and useful art, machine, article of manufacture, or composition of matter, or any new and useful improvement thereof, may be patented if the act of invention is involved. Therefore, every inventor with a valuable invention should take advantage of the Patent Laws and proceed for patent protection in order to safeguard his rights.

A patent gives the inventor the exclusive right to prevent others from making, using, or selling the invention claimed in the patent for a period of seventeen years.

The Patent Laws were enacted for the benefit of the inventor to give him protection for the features of his invention which are patentable. These features must be properly and concisely set forth and claimed in a formal application for patent, in order to comply with the requirements of the Patent Laws. For that reason, unless the inventor is familiar with patent matters, he should engage a competent registered patent attorney or agent to represent him. We are registered to practice before the U. S. Patent Office and are prepared to serve you in the handling of your patent matters.

A specially prepared booklet entitled "Patent Guide for the Inventor", containing detailed information with respect to patent protection and procedure, together with a "Record of Invention" form will be promptly forwarded to you without obligation upon request.

CLARENCE A. O'BRIEN & HARVEY JACOBSON

Registered Patent Attorneys

92-E DISTRICT NATIONAL BUILDING • WASHINGTON 5, D. C.

Patents

Trademarks

Copyrights

CLARENCE A. O'BRIEN & HARVEY JACOBSON
Registered Patent Attorneys
92-E District National Bldg., Washington 5, D. C.
Please send me copy of "Patent Guide for the Inventor" and also "Record of Invention" form. This request does not obligate me.

Name_____

Address_____

City_____ State_____
(Please write or print plainly.)

Copyrighted material

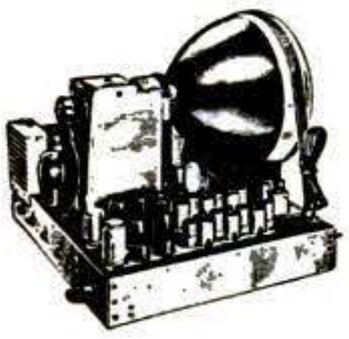
Everything in Radio at Lowest Prices!

FREE

Send for ALLIED'S 180 Page Catalog

BUILDER'S KITS
TELEVISION SETS
HI-FIDELITY SOUND
AMATEUR GEAR
THOUSANDS OF PARTS
TUBES, TOOLS, TESTERS
BOOKS & DIAGRAMS

Everything for Servicemen, Engineers, Experimenters, Builders, Soundmen, Amateurs



Radio's Leading Buying Guide

Get ALLIED'S 1949 Catalog—biggest and most complete in Radio. Get *everything* you need from the world's largest stocks of top-quality equipment—at down-to-earth money-saving prices. Have the advantages of speedy reliable shipment, expert personal help, and complete satisfaction on every purchase. Get more for your money at ALLIED—Radio's Largest Supply House. Send today for your FREE ALLIED Catalog—the preferred Buying Guide to *everything* in radio and electronic equipment.

ALLIED RADIO

ALLIED RADIO CORP.,
833 W. Jackson Blvd., Dept. 7-E-9
Chicago 7, Illinois

FREE

☐ Send FREE 1949 ALLIED Catalog.

Name.....

Address.....

City.....*Zone*.....*State*.....

PRINT YOUR OWN POST CARDS

COMPLETE OUTFIT *only* $7.50

Amazing results in sales, inquiries and contacts . . . saves time and money . . . very easy to use GEM STENCIL DUPLICATOR is ideal for *Advertising, Announcements, Notices, Labels, Forms, Price Lists*—hundreds of uses for every type of business and organization. Comes complete with all supplies, instructions and 60-page Book of Ideas.

FREE TRIAL OFFER: Try it before you buy it! Write and a GEM OUTFIT will be sent you postpaid After 10 days, send only **$7.50** or return the GEM, no questions asked. The GEM must sell itself; you be the judge.

BOND EQUIPMENT CO. • Dept. 151
6633 Enright • St. Louis 5, Mo.

SEND NO MONEY • FREE TRIAL OFFER

FREE HOBBY BOOK

For MEN and BOYS

TELLS HOW TO LEARN TO MOUNT BIRDS and **animals, fish,** pets, and all game. Learn to **TAN SKINS** with wonderful **Krome-Tan.** Simple as **ABC.** Many earn big **PROFITS** in spare time mounting for others. Great **FUN.** Wild game not needed. Over **500,000** students since 1903. **RUSH** postal **TODAY** for **STRANGE BOOK,** over 100 game pictures. **FREE.** No obligation. **State AGE!**

N. W. School of Taxidermy, 2605 Elwood Bldg., Omaha 2, Neb.

Earn $280 to $340 a Month

3,000 R. R. Station Agents Needed Now

APPROVED FOR VETERANS

Be a R.R. station agent in 4 to 6 months. Important, responsible work—that's why the salary is high, $280 to $340 per month or more. Ask your local R.R. agent about this opportunity. Our placement record of qualified men is nearly 100%. We've placed hundreds; railroads want our trainees. A dependable school since 1897; located downtown. Start any Monday. Part-time work available. Get the facts **free**—write today.

BOYLES COLLEGE — Dept. 15 — 18th at Harney — Omaha, Nebr.

FURNITURE MAKING and CABINET WORK

***By* B. W. PELTON**

Complete Step-by-step Directions for making Every Type of Furniture—Including Built-in Conveniences and Home-remodeling Jobs

Here, in a great new handbook is everything you want to know about furniture making: cabinet work, repair jobs, and remodeling projects.

Accurate drawings and practical instructions show you all the tricks of the trade and the real professional methods of repairing, refinishing and reupholstering worn or broken pieces. And there are complete directions for every type of home-remodeling project.

Every job is explained in careful detail by a master craftsman who gives you authentic instructions on exactly how to carry out each step in the work—from obtaining the materials to the final finishing operations: staining, varnishing, waxing, etc.

MAIL THIS COUPON

D. VAN NOSTRAND COMPANY, INC.
250 Fourth Avenue, New York 3, N. Y.

Examine This Great New Book FREE!

Please send me a copy of "Furniture Making and Cabinet Work". Within 10 days I will either return the book, or send you $2.95, plus postage, as a down payment, and $2.00 a month for two months until the total price of $6.95, plus postage, is paid. *(If you send entire amount of $6.95 with this coupon, we will pay postage. Same return privilege and refund guarantee if not completely satisfied.)*

SEND NO MONEY

NAME.....
ADDRESS.....
CITY.....ZONE...STATE.....

Pop Sci—May 1949

Copyrighted material

INVENTORS

Patent laws encourage the development of inventions.

We recommend that an inventor employ a registered Patent Attorney or agent, if the inventor is not familiar with patent matters. This is because the value of a patent depends largely upon the skillful preparation of the specification and claims in the patent application.

The firm of McMorrow, Berman and Davidson is registered to practice before the United States Patent Office. Additionally it engages patent attorneys able to readily understand inventors' disclosures, to advise concerning patentability, and to prepare appropriate specifications and claims.

If an inventor believes he has an invention, a search of the most pertinent prior U. S. patents should be made and a report obtained relative to its patentability. Where such report indicates that the invention appears patentable, in order to secure protection, diligence should be exercised in making application for a patent.

Send for a copy of Patent Booklet entitled "How To Protect Your Invention." This booklet contains information on patent protection and procedure. You will also receive an "Invention Record" blank. This will be promptly forwarded to you upon request—no obligation.

McMORROW, BERMAN & DAVIDSON

Registered Patent Attorneys

PATENTS • TRADE MARKS • COPYRIGHTS

142-Y VICTOR BUILDING, WASHINGTON 1, D. C.

McMORROW, BERMAN & DAVIDSON

Registered Patent Attorneys

142-Y Victor Building, Washington 1, D. C.

Send me your Patent Booklet, "How To Protect Your Invention", and also "Invention Record" form at once. I understand this request does not obligate me.

Name.....

Address.....

City.....

(WRITE OR PRINT NAME CLEARLY)

Copyrighted material

YOUR OWN

BUSINESS WITH A FUTURE!

Get the facts FREE!

a few cents worth of materials BRINGS YOU DOLLARS!!

Rich profits are waiting to be tapped in this *new* field. New MIRACLE finish gives a velvety, luxurious surface to radios, lamps, toys, signs, store displays, figurines, auto dashboards, and hundreds of other items. Make old objects beautiful and saleable — make new things *worth much more* with this soft, rich covering that can be applied to any surface, even if old and worn.

Have Your Own Lasting, Successful Business—Be Your Own Boss—Help Fill Huge Demand ... No Experience Is Necessary

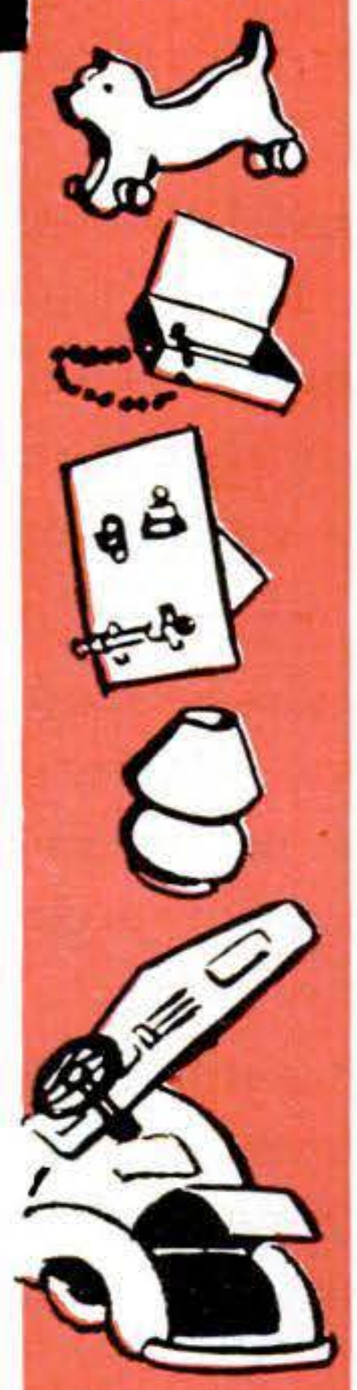
Yes, you can learn in a *few days* to start MAKING MONEY! Everything you need is furnished, including fully detailed, illustrated instructions that are *complete* and *easy* to understand. Every point is explained, to show you how to start on the road to *big money*, full or spare time, right in your own home.

EVERYTHING COMPLETE

In addition to full instructions, you get a complete set of materials that enables you to start *at once*. A few cents worth of materials *can mean many dollars* in return to you — you can earn up to $500 or more per month full time; up to $75 per week spare time.

ACT NOW

Grasp this opportunity TODAY — start your own business. It's too good to miss! SEND NO MONEY — fill out the coupon and stick it on a post card or in an envelope and mail today for full details, FREE sample of FLOK-KRAFT covered material, and hundreds of useful and profitable IDEAS. Do it NOW — *be first!*



TOYS
JEWELRY BOXES
DISPLAY PIECES
LAMPS
CAR DASHBOARDS
CAR TRUNKS

Covers Wood, Fabric, Metal, Plaster, Plastic Glass, or any Surface

USE THIS COUPON

SEND NO MONEY

COAST INDUSTRIES
Dept. PS-5 1507 West Manchester, Los Angeles 44, Calif.
Please rush me all the details!

NAME _____
STREET _____
CITY _____
STATE _____

FLOK KRAFT TRADE MARK REG.

NEW FLUORESCENT FIXTURE with GE CIRCLINE LAMP!

GUARANTEED FOR 1 YEAR!

A strikingly beautiful fixture in polished aluminum finish. Suitable for every room. Model C-32AP (illustrated), $8.75. Model C-32S with etched glass shade, $12. Sent POSTPAID anywhere in the U. S. upon receipt of cash order. C. O. D.'s sent F. O. B. factory. Write for free literature on full line.

$8.75 POSTPAID

HANOVER LIGHTING SALES
Box 186E, Dept. SC, Hanover, Pa.

CORRESPONDENCE COURSES IN RADIO and ELECTRICAL ENGINEERING

Tuition $25

ELECTRICAL ENGINEERING. Get good grasp of wide electrical field. Modern. Very understandable. Theory made easy. **RADIO ENGINEERING.** Extra fine course in radio, public address, photo-electric work. Trains you to be super-service man, real vacuum tube technician. Tuition ONLY $25, either course. Deferred payment plan. Servicemen needed badly.

FREE Electronic Kit given to students enrolling by June 1st. Write for free school catalog, student magazine, etc.

LINCOLN ENGINEERING SCHOOL, Box 931, PS-5, Lincoln, Nebr.

LEARN MOVIE PROJECTION THEATRE MANAGEMENT

The Motion Picture Theatre Business offers big opportunities for trained men. Get into a fascinating field with a promising future. Train at home in spare time. Free Catalog. Established 22 years.

THEATRE INSTITUTE, 385 Washington St., Elmira, New York

LEADING ALL BRANDS CIGARETTES

SAVE MONEY—BUY CARTONS

Add 2¢ per carton 150 to 500 miles
Add 3¢ per carton 500 to 1000 miles
Add 4¢ per carton beyond 1000 miles
Minimum order — 5 cartons. No C.O.D.'s.

REX PRODUCTS DEPT. 8
434 North Gay Street, Baltimore 2, Md.

$1.47 Postage Prepaid within 150 miles

Learn PHOTOGRAPHY

Win success in photography by spare time Home Study or at our famous Resident School in the heart of New York. Commercial, Advertising, Portrait, Color, etc. 39th year. Write today!

NEW YORK INSTITUTE OF PHOTOGRAPHY
Dept. "5", 10 W. 33 St., N. Y. 1, N. Y.

LEARN A PROFESSION WITH THE *Prestige of Precision*

WATCH REPAIRING

YOU CAN START IMMEDIATELY

BIG MONEY WHILE LEARNING

Complete Home Correspondence Course or G.I. approved Residence School Plan. ★ *Post Graduate Plan* at School for correspondence students.

AMERICAN INSTITUTE of SPECIALIZED WATCH REPAIR
Dept. 40. 270-76 East Bldg., Grand Rapids, Michigan

Copyrighted material

PATENT PROTECTION FOR INVENTORS

A patent is a valuable right. On the basis of a constitutional provision Congress has established a system under which inventors may secure the exclusive right to prevent the unauthorized use, manufacture and sale of their inventions for periods of seventeen years. The inventor secures this protection by obtaining a patent.

*U*nless an inventor is thoroughly familiar with such matters, he is advised to employ a competent registered patent attorney, as the value of patents depends largely upon the skillful preparation of the specification and claims.

*W*e recommend that you authorize us to conduct a search through the United States patents pertinent to your invention and to submit a report setting forth our opinion with respect to its patentability.

*T*his firm is registered to practice before the U. S. Patent Office and is available to assist inventors in the preparation and prosecution of their cases. Detailed information and the preliminary steps to take to obtain patent protection will be furnished upon request. *Form below for mailing convenience.*

VICTOR J. EVANS & CO. • *Merlin M. Evans*

REGISTERED PATENT ATTORNEY

440-E MERLIN BUILDING, WASHINGTON 6, D. C.

VICTOR J. EVANS & CO. • Merlin M. Evans
Registered Patent Attorney
440-E Merlin Building, Washington 6, D. C.

Please send me without obligation a copy of your booklet "Patent Protection For Inventors" together with your convenient "Evidence of Invention" form.

Name.....

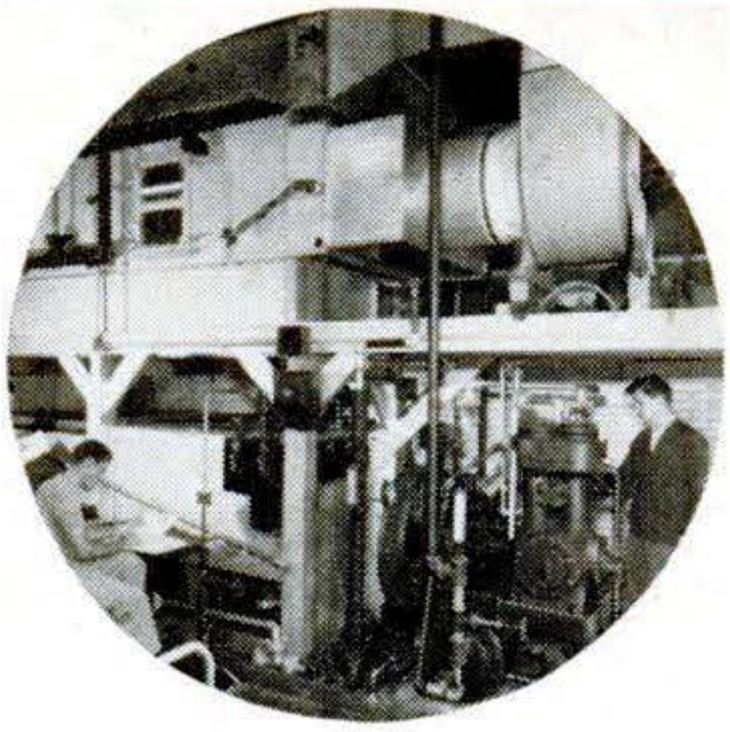
Address.....

City and State.....

PATENTS TRADEMARKS COPYRIGHTS

Copyrighted material

• SPECIALIZE •



Prepare Now For a Career in Refrigeration, Heating, Air Conditioning

In 6 months to 2 years you can train for a substantial career in industry, or a business of your own. Under the unique concentric curriculum at the Milwaukee School of Engineering each course unit is complete in itself and prepares you for specific occupational objectives. The length of training you receive varies with the goal you wish to reach. Over 1500 students from 48 states and 18 foreign countries are now enrolled. Faculty of 85 specialists. 35,000 former students in industry all over the world.

Choose the Course That Interests You Most

You can become a—

Refrigeration Serviceman in 6 months

Refrigeration and Heating Serviceman in 12 months

Refrigeration, Heating and Air Conditioning Technician in 2 years

OTHER COURSES AVAILABLE

SERVICE
6 to 12 Months
- Electricity
- Welding
- Refrigeration
- Heating

TECHNICIAN
1 to 2 Years
- Electrotechnics (Power)
- Radio and Television
- Electronics
- Refrigeration, Heating and Air Conditioning

PROFESSIONAL
3 Years
- Electrical Engineering Bachelor of Science Degree

Major in Electronics or Power

MILWAUKEE SCHOOL OF ENGINEERING
A Technical Institute Founded 1903, by Oscar Werwath

Terms start July, September, January, April
Write today for free booklet

MILWAUKEE SCHOOL of ENGINEERING

A Technical Institute Founded 1903 by Oscar Werwath

• SPECIALIZE • BUILD YOUR CAREER WITH PRACTICAL TECHNICAL TRAINING •

MILWAUKEE SCHOOL OF ENGINEERING
Dept. PS-549, N. Broadway and E. State, Milwaukee, Wis.

Without obligation send me free booklet "Career Building" and more details on course in Refrigeration, Heating and Air Conditioning or.....course.

Name.....Age.....

Address.....

City.....

BE A GOVERNMENT LICENSED AIRPLANE AND ENGINE MECHANIC

Train Now at ***LINCOLN***

EARN BIG PAY IN

AVIATION

Our new enlarged school now offers these courses: **MASTER AVIATION MECHANICS,** CAA Approved 1 Yr. Airplane & Engine Mechanics Course, **REFRESHER AIRPLANE & ENGINE MECHANICS.** Designed for **veterans** with aviation mechanics experience. Either course is available to veterans under the **G.I. Bill of Rights. Write today** for complete information.

LINCOLN AVIATION INSTITUTE
UNION AIR TERMINAL DEPT. A-5 LINCOLN, NEBRASKA

SURPLUS HIGH SPEED DRILLS

ALL NEW! Set of 60 High Speed wire gauge drills—sizes 1 through 60, complete with rust-proof metal drill stand. Keeps drills sorted. Always handy in shop or home. Wgt. 1½ lbs. Original value $25.00! Order now and save! Complete set, while they last.....each **$8.95**

30 High Speed drills, assorted sizes and lengths (without stand). All new! Original value approx. $15.00. Wgt. 3/4 lbs. Good assortment for any mechanic or craftsman! Limited supply. 30 drills.....**$3.50**

Prices F.O.B. Culver City, Calif. Send check, money order or cash. 25% deposit required on C.O.D. orders.

JACKSON-DUFFY CO.
Dept. PSM 5-9 P. O. Box 168, Culver City, California

URAC "185" *NOW AVAILABLE...* IN SMALL CONTAINERS

Best bonding agent for gluing structures: furniture, toys, plastic table tops, phenolic and melamine laminates, masonite, ETC....Easy to mix, easy to use. Water Resistant, Rot proof, Stain proof. Pts. $1.50; Qts. $2.25; Gal. $5.50 and 5-gal. $23.75 including hardener.

Send Payment and Save postage and C.O.D. FEES

*TRADE NAME REGISTERED BY AMERICAN CYANAMID CO., MFR.

THE NELSON COMPANY
IRON MOUNTAIN - MICHIGAN

OWN YOUR OWN BUSINESS!

Repair electrical appliances of friends and neighbors. Service electrical equipment in factories, stores, etc. New Shop Method home training system. Rush name today for FREE BOOK and special form for getting Electronic kit, illustrated instructions on new easy payment plan. Pay us later with your **EARNINGS WHILE LEARNING.**

CHRISTY TRADES SCHOOL
2835 N. Central Ave. Dept. D-7701 Chicago 34

TRI-STATE COLLEGE

B. S. DEGREE IN 27 MONTHS
66th Year. Students from all over the world.

ENGINEERING—Courses in Civil, Electrical, Mechanical, Chemical, Aeronautical and Radio (including Television). Also Bus. Admin., Acc't. and Sec. Science. Low living costs. College cafeteria on campus. Graduates in demand. **Enter March, June, Sept., Jan. Write for Catalog.**
559 College Avenue, Angola, Indiana.

HANDEE CAR WASHER

RINSES AS IT WASHES!

Thousands of tiny sprinklers wash car in a flash! Waterproof glove bonded to live-foam sponge rubber pad, can't scratch or mar. Attach to any garden hose! Constant water-flow rinses as it washes! Soft, light, strong! Order yours today! Send no money—simply pay postman $1.98 plus postage. Satisfaction guaranteed. (Salesmen write!)

MICHIGAN MERCHANDISERS
Box 223 Fenton, Mich.

Copyrighted material

Now *YOU-TOO*-Can Be a "WHIZ" on ANY AUTO REPAIR JOB!

"Motor's Manual paid for itself on the first 2 jobs, and saved me valuable time by eliminating guess work."—W. SCHROP, Ohio

"Instructions so clear, have no trouble learning anything about any car. Now working as mechanic in big plant." — SAM. ORDONEZ, Cal.

"Fixed motor another mechanic had worked on half a day. With your Manual, I did it in 30 minutes!"—C. AUBERRY, Tenn.

"So complete, easy to understand—have done jobs with Manual I would not have attempted without it."—C. L. VANERSTROM, Mich.

MoToR's AUTO REPAIR MANUAL Is Showing Thousands of Men How to Handle ANY Job on ANY Car—*Faster* and *Easier!* Now Let It Go To Work For YOU!

FREE-7 Day Offer

HERE'S the book YOU need to "Whiz through" *every* auto repair job—including those "ornery," extra-hard ones that give other mechanics such a "headache"!

THOUSANDS of men like the four above are letting *MoToR's AUTO REPAIR MANUAL* help them "lick" even the *toughest* repair problems—in LESS TIME, with LESS work and MORE profits than ever before!

Complete "How-To-Do-It"

Now let these 200,000 factory-correct instructions and facts, 1700 "how-to-do-it" pictures, 200 "quick-check" charts and tables, go to work for YOU! With them you can repair anything from carburetor to rear end, Ford to Cadillac, shaky '35 model to shining '48—quickly, easily, right!

Just look up make, model, job in quick index; then let official instructions, "boiled down" from 150 auto manufacturers' factory shop manuals, show you how, step-by-step! Sturdy binding, 8½ x 11 inches, over 700 pages.

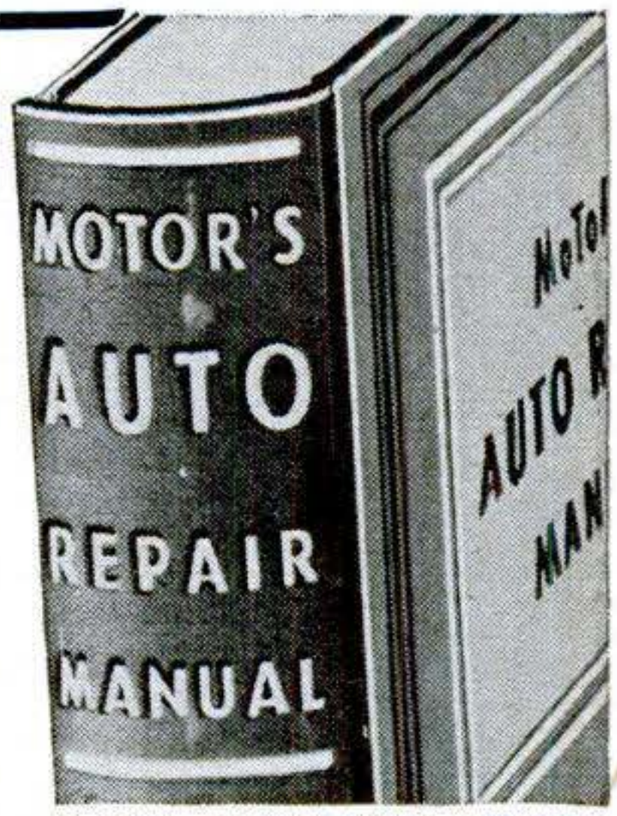
SEND NO MONEY

Find out for **yourself** how this book can pay for itself first few days you use it. **Try it FREE 7 days!** Just mail coupon. Pay postman nothing. **Put Manual to actual test.** Then, if not entirely satisfied with it, return book in 7 days, pay nothing. Mail coupon today! MoToR Book Dept., Desk 25, 250 West 55 Street, New York 19, New York.

Every Job on Every Car Built Since 1935!

Nearly 200,000 service and repair facts on: **American Bantam • Auburn • Austin • Buick • Cadillac • Chevrolet • Chrysler • Cord • Crosley • DeSoto • Dodge • Ford • Frazer • Graham • Hudson • Hupmobile • Kaiser • Lafayette • LaSalle • Lincoln • Lincoln Zephyr • Mercury • Nash • Oldsmobile • Packard • Pierce Arrow • Plymouth • Pontiac • Reo • Studebaker • Terraplane • Willys.**

700 big pages; including 70 pages of carburetor text, charts, illustrations covering all models. Over 200 charts, tables: Tune-up Chart; Valve Measurements; Torque Wrench Reading; Starting Motor; Engine Clearances; Generator; Body Service; Dash Gauges; Brake Specifications; Front End Measurements, etc., Engines; Electric, Fuel, Cooling, Lubricating Systems; Transmissions; Universals; Front Ends; Wheels; Rear Ends, etc.



MoToR **Published by MoToR, The Leading Automotive Business Magazine.** MoToR's manuals assure high standards of repair work.

Same FREE 7-Day Offer Applies on

MoToR's Truck Repair Manual

For mechanics, truck specialists, service stations, fleet owners. Covers EVERY job on EVERY truck made since 1936! 1400 pictures, 952 pages, 300,000 facts. Used by Armed Forces. Warranted to contain every essential fact you need to know. Strong binding size 8½ x 11.

Covers all types Gasoline Engines; Diesels and Hesselmans. **Fuel Systems, Governors, Lubrication Systems, Ignition Systems, Starters, Generators, Clutches, Transmissions, Axles, Torque Dividers, Transfer Cases, Brakes, Steering,** etc., etc.

Also services buses, farm and industrial tractors, contractor, and road building equipment, stationary power machinery, etc. (on all parts described in Manual.)

Offered on same FREE 7-Day examination as Auto Repair Manual. Check box in coupon at right.

MAIL COUPON NOW FOR 7-DAY FREE TRIAL

MoToR Book Dept., Desk 25, 250 West 55 Street, N. Y. 19

Rush to me at once: (Check box opposite book you want)

☐ **MoToR's AUTO REPAIR MANUAL.** If O.K. I will remit $1 in 7 days, (plus 35c delivery charge), then $2 monthly for 2 months, and a final payment of 95c a month later. **(Foreign price, remit $8 cash with order).**

☐ **MoToR's TRUCK REPAIR MANUAL.** (Described at left.) If O.K. I will remit $2 in 7 days, and $2 monthly for 3 months, plus 35c delivery charge with final payment. Otherwise I will return book postpaid in 7 days. **(Foreign price, remit $10 cash with order.)**

Print Name.....Age.....

Print Address.....

City..... Zone No. (if any) .....

State..... Occupation.....

☐ **Check box and SAVE 35c delivery charge** by enclosing WITH COUPON entire payment of $5.95 for Auto Repair Manual (or $8.00 for Truck Repair Manual). Same 7-day return-refund privilege applies.

Copyrighted material

Bigger PROFITS

For the

Bronze Baby Shoe Business

When you use SPECIALIZED EQUIPMENT and TOP GRADE MOUNTINGS

Bases in unbreakable Metal, Onyx or Marble Book Ends... Picture Frames... Ash Trays . . . Desk Sets, etc.

RAMYR SELENIUM PLATERS
10 to 250 amps.
Model Shown 10 amps. $39.95

COMPLETE...
COPPER PLATING ASSEMBLY $97.50 FULL PRICE
for Baby Shoes, Plastics, Ceramics, etc.
with RAMYR Selenium Rectifier, lead lined tank, anodes, solutions, chemicals, etc. Instruction Course included.

We specialize in complete Copper, Silver and Gold Plating Assemblies for Baby Shoes, Jewelry, Trophies and Novelties.

Hollywood BRONZE SUPPLY
World's Oldest & Largest Manufacturers of Bronzed Baby Shoe Mountings
1770 N. Vermont Avenue • Hollywood 27, California

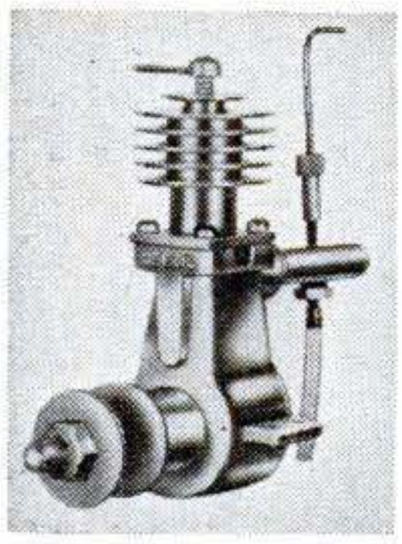
Send descriptive literature and wholesale prices

I AM:
- ☐ Engaged in Plating Baby Shoes
- ☐ Interested in starting a Bronzed Baby Shoe Business
- ☐ In the General Plating Business
- ☐ Interested in Gold & Silver Plating for jewelry, novelties, etc.

NAME _____
Address _____
City _____ Zone ____ State _____

CHECK, CLIP AND MAIL COUPON NOW!

REAL DIESEL ENGINE



$2.95

WE'RE CRAZY, they tell us, giving away a real diesel engine, complete with cylinder and piston, carburetor, crankshaft and connecting rod. All parts completely machined, ready for easy assembly. **ONLY $2.95.** How do we do it? We're selling thousands of **DEEZILS.** So production's up; costs tumble down. **DEEZIL** is a precision engine. Actually runs at 7500 RPM. Produces 1/7 HP.
Ideal for planes, boats, midget cars.
Send $2.95 plus 25c postage today.

GOTHAM HOBBY CORP.
107 East 126th Street New York 35, N. Y. Dept. "S"

TALK ANYWHERE-INSTANTLY-TO ANYONE! WITH INTERTALKIE

Just push buttons and talk to or from 1 to 7 different places! Not a phone—loud room volume—**No electric "plug-ins" or tubes needed!** Sit or hang it! **Simple and quick to hook up.** For **homes, offices, stores, farms,** etc. Guaranteed satisfaction. Write for **free** details today! Dealers and agents wanted.

as low as **$9.97** each

MIDWAY CO., PS-5, Kearney, Nebr.

REPLACE *Old* wood or metal venetian blind slats with

LIFE TIME FLEXIBLE STEEL

24 beautiful baked enamel colors to choose from in all sizes. Write for color book and full information and a free 12 inch ruler.

LIFE TIME PRODUCTS CORP.
P. O. Box 2742 Haselton Sta. Youngstown 8, Ohio **or** 631 E. Florence Ave. Los Angeles 1. California

---

BE A NOTARY PUBLIC

Get paid for life for signing your name. Old legal-supply house. 22 cities, guarantees your appointment by governor if you qualify. No training needed, no course to study. As a public notary your signature is important; you certify legal papers by signing, get paid. Money intake grows as you become known. Like compound interest. Income steady, for life. We equip you completely. Pay us after you are appointed—2 payments $12.50 each. That's all. Details free.

STATIONERS EXCHANGE Boerne 25, Texas

CAR CLEANER

Your car sparkling clean—in a jiffy—magic "sponge" cleaning-cloth. Simply glide over car. PRESTO! Dust, grease, dirt, and grime disappear in a jiffy. Leaves finish clear, lustrous. Autos gleam like a mirror.

SAMPLES for AGENTS
Sample offer sent immediately to all who send name **at once.** Penny postal will do. **Send no money—JUST YOUR NAME.**
KRISTEE CO., 724 Bar St, Akron, Ohio

Miracle of Modern Electronics

Big! Powerful! Clear Tone!

TUBELESS ELECTRONIC RADIO $5.00 INCLUDES EVERYTHING

Secret patented electronic power unit. Powerful, sensitive, big-radio clearness and tone. Costly precision parts; 6 x 3 x 1½" red plastic case, single control tuning. No electricity; no batteries. Comes complete—nothing more to buy. Includes radio, 50-ft. antenna, lead-in, insulators, ground-clasp, super-sensitive headphones. Guaranteed performance. Send $1; pay postman C.O.D. balance, plus postage.

PATRICK LABORATORIES
Dept. F 2450 E. 52nd St., Indianapolis, Ind

Copyrighted material

Choose one of these 2 GREAT FIELDS

– Get Ready QUICK at COYNE!

This big fire-proof building is occupied entirely by **Coyne.**

Prepare for Success Quickly . . . in the

GREAT SHOPS OF COYNE

Conditions today are different. Many "one-operation" jobs that pay well will not last. Plan for steady pay and advancement by training NOW. Come to the great shops of COYNE in Chicago, for "all-around" training in **Electricity or Radio-Television**—the 2 great opportunity fields.

NOT "HOME-STUDY" COURSES

Our famous "**Learn-by-Doing**" method gives you practical experience on a massive outlay of equipment. Not by correspondence, but actual shop work plus necessary theory. You are trained right here in the great **Coyne** shops that has been training men and young men for over 50 years.

ELECTRICITY

INCLUDING INDUSTRIAL ELECTRONICS

Big future in Power Plant Work, Motors, Armature Winding, Home and Factory Wiring, Appliances, Refrigeration, Maintenance, Illumination, etc. Electricians are in demand everywhere —lifetime job service to Coyne graduates. Send for BIG FREE BOOK.

RADIO-TELEVISION SERVICE

A great field now, even greater growth ahead. Here at COYNE you're trained for Construction, Testing, Trouble-Shooting on Radio, Public Address, Sound Picture Units. Training includes FM, Television Servicing, etc. Our training is quick, easy, practical. Many **Coyne** trained men own well-paying radio businesses of their own.

ELECTRIC REFRIGERATION

Added training in Electrical Refrigeration can now be included.

G. I. APPROVED

NON-VETERANS who are short of cash can finance most of their tuition and pay in easy monthly payments after graduation. Many earn while learning.

COYNE 50th ANNIVERSARY

B. W. COOKE, President

COYNE ELECTRICAL AND RADIO SCHOOL

500 So. Paulina Street, Dept. 59-73H, CHICAGO 12, ILL.

LARGEST, OLDEST, BEST EQUIPPED SCHOOL OF ITS KIND IN THE U.S.

Pick Field You Like —Mail Coupon for Big FREE Book

Whether you prefer Electricity, or Radio, train on actual equipment, at **Coyne.** We have a big, fully illustrated book on each course, and we'll send you the one you want, without obligation. Mail coupon — TODAY.

B. W. COOKE, President
COYNE ELECTRICAL AND RADIO SCHOOL
500 S. Paulina St., Dept. 59-73H, Chicago 12, Ill.

Send me your BIG FREE BOOK — for the course checked below. This does not obligate me and no salesman will call.

☐ ELECTRICITY ☐ RADIO—TELEVISION

NAME.....

ADDRESS.....

CITY.....STATE.....

Copyrighted material

Be Your Own Boss!

START A SUCCESSFUL WHOLESALE BUSINESS

with as little as $288 capital

Retail only $4.98

Immediate earnings of $100 to $250 weekly from a business of your own that can be operated from your home—are offered by manufacturer of one of the newest, most needed and fastest selling household items on the market today.

The product: a sensationally successful $4.98 electric water heater that snaps onto any cold water faucet, plugs into any electrical outlet and gives immediate flow of hot water. So compact, weighs only one pound, yet a masterpiece of precision efficiency. With a quarter million units quickly sold in short period, the surface has not even been scratched.

Exclusive Local Wholesale Distributor rights give you a protected business in your area, backed by national advertising campaign, sells on sight to every home, to dealers, canvassers, agents, factories, stores, garages and many other outlets. Many repeat sales.

Only investment required is $288 for stock to fill immediate orders in your territory. Tested, result-getting circulars, postcards and other selling helps supplied. For immediate information, write—

Mr. U. L. Smith

MARVEL SALES CORP.

18 EAST 41st STREET, NEW YORK 17, N. Y.

MAKE YOUR OWN! WITH

Griffin READYCUT LEATHER PROJECTS

Over 100 KITS in every kind of Tooling and Carving Leather, accurately cut, all parts included. Only Top Grade Leathers used. You do the choosing. You do the tooling, carving, stamping, the punching and assembling.

SEND FOR COMPLETE CATALOG
Please send 10c to cover mailing.

SINCE 1924
OUT OF THE WEST, THE HOME OF LEATHER CARVING

Griffin Craft Supplies
5515-B GROVE STREET
OAKLAND 9, CALIFORNIA

EVERYTHING FOR THE LEATHER WORKER

Largest, most complete stock of *Leathercraft Tools* and *Accessories* in U. S. A.

HIDES AND SKINS of Craft Leathers of every kind if you prefer to cut your own.

TUNE-UP Amazing

NEW "Jet-Matic" Compression Tester

Quickly Tells Condition of Rings, Valve, etc.

MAKES Motor Tune-Up accurate. Balanced, precision gauge. New ultra-sensitive movement—300 lb. pressure scale to test cars **years** ahead. Fits **all** models. Release mechanism simple, foolproof, built into "stub type" handle. Easy to read dial—designed in 4 colors. Built to last a life time. Guaranteed 3 years.

SEND NO MONEY. Just send name, address. Pay postman $7.50 plus postage. If not satisfied, send "Jet-Matic" back for refund. Or send payment, WE pay postage. Hurry—Order NOW from **Gale Hall Engineering, Dept. 1099, Boston 18, Mass.**

SWISS MUSIC MOVEMENTS

Surprise yourself with the amazing number of uses for these fine imported units. Put them in your favorite stuffed toys, make novelty and cigarette boxes musical. Specify category when ordering. NURSERY, FOLK, WALTZES & POPULAR. **$2.25**

SPECIAL JUST ARRIVED FROM SWITZERLAND 2 TUNE WALTZ AND OPERATIC MOVEMENTS PLAYS 5 MINUTES, WHILE THEY LAST $3.50 POSTPAID.

SEND FOR FREE TUNE LIST—MAKE MUSICAL TOYS FOR PLEASURE AND PROFIT

MARITIME — 13 East 60th St. — New York 22 — New York

HYPNOTIZE ANYONE

Yes, anyone. Learn modern speed hypnotism. Secrets revealed. Self-hypnosis. Exciting experiments. Overcome inferiority complexes, smoking, alcoholism, stuttering, nailbiting, phobias, insomnia, stagefright. Improve your memory. Private & class instruction available at Institute.

Complete homestudy course **$2**

12" Hypnotism record inducing Mass-Hypnotism & Self-Hypnosis . . $5

POWERS INSTITUTE OF HYPNOTISM, 1324 Wilshire Blvd., Dept. 54, Hollywood 14, Calif.

COMMERCIAL TRADES' GRADUATES GET THE BETTER JOBS because they are PROPERLY TRAINED!

Practical Shop Training In
Air Conditioning—Refrigeration
and/or
Electricity Major Appliances
Service, Maintenance & Installation
Write for Catalog PS4

COMMERCIAL TRADES INSTITUTE
200 South 20th St. Birmingham, Ala.
Member: Southern Association of Private Trade Schools
An approved school to TRAIN Veterans & Non-Veterans

ENGINEERING DEGREE IN 27 MONTHS

Big Demand for Graduates

AERONAUTICAL, CHEMICAL, CIVIL, ELECTRICAL, MECHANICAL and RADIO ENGINEERING (including Television).

Hundreds of young men are earning engineering degrees in this recognized institution each year—continuous operation. New terms start quarterly. Many students earn a major part of their college expenses in this large industrial center.

Low tuition. Competent instruction. Thorough intense practical program. Modern laboratory facilities including new physics lab. and modernized wind tunnel. Individualized instruction emphasized.

Approved for Veterans. Engineering preparatory courses. Students from 48 states and 21 foreign countries. Enter June, September, December or March. Send coupon for free catalog and full information. Enroll now.

INDIANA TECHNICAL COLLEGE
659 E. Washington Boulevard
Fort Wayne 2, Indiana

Please send me free information on B. S. Engineering. Degree in 27 months as checked.

☐ Aeronautical, ☐ Chemical, ☐ Civil,
☐ Electrical, ☐ Mechanical, ☐ Radio-Television.

Name.....

Address.....

Copyrighted material

NOW EASY TO START
A Big Business
ON A SMALL INVESTMENT

WARNER SUCCESS PLAN
Gives exact instructions showing you

- How to start in spare time
- How to use home as headquarters
- How to bring in the business
- How to do real METALIZING in genuine GOLD, SILVER, or BRONZE, by the easy Warner Method
- How to start without risking your job
- How to pyramid your profits
- How to be sure of steady, big income.

Don't turn this page until you've given serious thought to your future. In the uncertain years ahead, the men who own their businesses are the ones who will be happiest. A small start now easily can lead you to complete independence, freedom from time clocks, freedom from fear of lay-offs, freedom from the limits of a pay check.

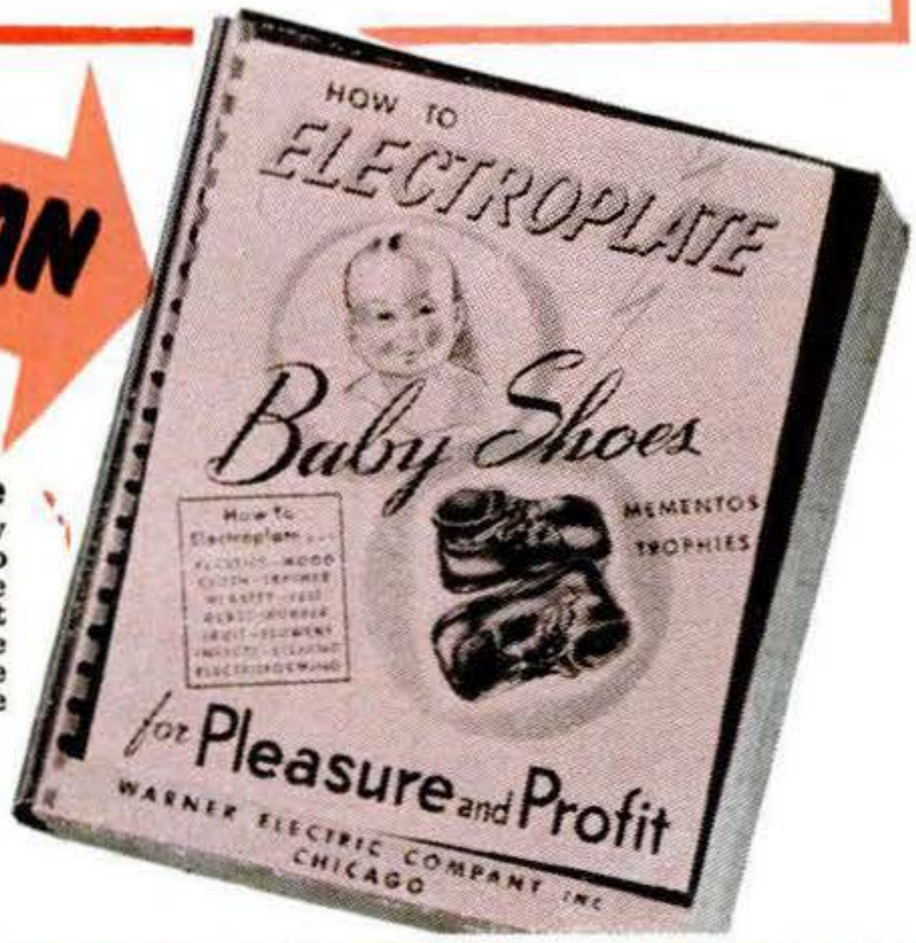
Now, while you can do it without risk—now is the time to investigate the exceptional opportunity offered you by the Warner Success Plan. Looking into the market, checking up on the possibilities for big sales and big profits will not cost you anything. Isn't this the time to lay the foundation for a future of complete independence—a life of happiness—a steady, dependable income?

METALIZING BABY SHOES AND OTHER KEEPSAKES

offers an exciting new opportunity to men or couples who want personal independence

If you'd like the feeling of being boss instead of being bossed—the Baby Shoe business is made to order for you. Just think of the appeal. A mother's love for her child—her desire to preserve forever the tiny shoes in which her baby took its first toddling steps. No wonder orders come easy and fast. No wonder profits are big. Then think of the Future. Fifteen Million babies in the last five years—three million last year—millions more next year. As long as babies are born, this business will prosper—in good times or bad. Think of the fun. Every job is different, interesting. And when you deliver a job and collect the money, you get a tremendous glow of satisfaction out of the mother's happy exclamations over your work. There's not another business I know of that offers you such big rewards in cash, in security, in a future, in independence that can be started on such a shoestring. You'll be glad you saw this ad—IF YOU SEND THE FREE COUPON.

READ THE ENTIRE PLAN
7 DAYS AT MY RISK



DON'T SEND A PENNY . . . Just Send Your Name

This is one of the most fascinating businesses you can imagine. There are 15 MILLION pair of baby shoes waiting right now to be METALIZED. The opportunities are unlimited. The future is very big. And it's a business in which the whole family can have fun helping. A perfect business for man and wife to start—or for two partners. And I want you to read the whole Plan at my risk. Don't spend a cent unless you go ahead.

I want every serious minded man to let me show what I've done in our own shops here in Chicago—reveal the exact facts about the profits to be made and the way to make them. I don't want you to spend a cent for supplies until you've studied the facts, talked them over with the family, and satisfied yourself that this is the ONE BIG OPPURTUNITY FOR YOU. That's why I allow you to read all trade secrets contained in the Warner Success Plan at My Risk. If you don't go ahead, you don't pay a cent.

WE SUPPLY EVERYTHING

You don't have to go "hunting" when Warner is behind you. We supply all materials, all mounts, chemicals, and metals. And you get the low prices made possible by our big quantity purchases and our own manufacture. You send for just what you need — and never have any big investment tied up in stock.

$5.00 AN HOUR

Yes, it's possible for one man to turn out enough work to make $5.00 an hour for his time. Think of how that pyramids when a partner or the whole family works.

Old Established Firm Backs You Up

The Warner Electric Company just celebrated its 26th year of success. You get a *Real Start* when you "join up with Warner"—you get real *Guidance to Success.*

Warner Electric Co., Dept. 25,
1512 Jarvis Ave., CHICAGO 26, ILL.

ALL FACTS FREE! *MAIL!*

Raymond E. Brandell, Mgr., Warner Electric Co.,
1512 Jarvis Ave., Dept. 25, Chicago 26, Ill.

As long as it doesn't cost me a cent, I'm willing to read the facts, investigate, and then give you my decision. Send the facts by next mail. No cost to me now or at any other time.

NAME_____

ADDRESS_____

CITY_____ Zone_____ STATE_____

Copyrighted material

DIESEL is Going Places Come Along!

Yes, Diesel is a trade with a future. Look at the way trains, busses, boats, trucks, factories . . . everywhere . . . are changing to Diesel Power. It is going to take man power to keep the engines going. That means a great **demand** and great **opportunities** for the Diesel-trained man! That man can be YOU, if you are an average, ambitious, mechanically-inclined man.

KEEP YOUR JOB—LEARN AT HOME!

You don't have to give up your present job to learn Diesel. With U.E.I. training, you get complete fundamentals in practical, easy-to-understand **home-study** lessons. Includes operation, fuel systems, repairs, auxiliary equipment, etc. You may also get practical training in our modern, well-equipped shops. Experienced Diesel men show you short-cut methods, help you learn faster. High school diploma not necessary. Our 22nd year.

Success Demands Action, Act Now!

If you want to go places with DIESEL, act promptly. Fill out and mail coupon below for all the facts. No obligation. Do it AT ONCE!

Utilities Engineering Institute
***Diesel Division*, 2521 Sheffield Avenue**
Dept. DM-1, CHICAGO 14, ILLINOIS

Mail Coupon Today for FREE FACTS

UTILITIES ENGINEERING INSTITUTE
***Diesel Division*, 2521 Sheffield Ave.**
Dept. DM-1, Chicago 14, Illinois

YOU BET, I want to go places with Diesel! Rush FREE FACTS on U.E.I. training and Diesel opportunities.

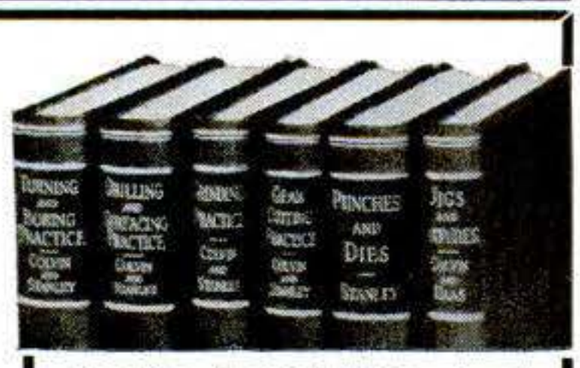
NAME _____ AGE _____

ADDRESS _____

CITY _____ ZONE OR COUNTY _____ STATE _____

☐ Check here for special information if you are under 17.

Your stepping-stone to a BETTER-PAYING MACHINIST'S JOB



Master shop work quickly with these books

This big home study and reference course gives you the practical facts on machines and methods you need to advance in machine shop work. Take advantage of the other man's experience as found in books, to solve your problems, increase your efficiency with

Revised and Enlarged
These 6 volumes give you not only accepted methods and practices, but latest developments in machine shop work, enabling you to meet today's shop requirements and needs.

6 volumes, 2645 pages
2747 illustrations

THE AMERICAN MACHINISTS' LIBRARY

This library of machine shop practice was written for practical men. It gives you the best methods for every kind of machine shop work. It fully explains lathes, drills, and other machine tools and their operation, automatic screw machines, speeds and feeds, gear design and production, jigs and fixtures, punch and die work, metal surfacing, etc., etc. All plainly written and fully illustrated.

NO MONEY DOWN—Easy payments

EXAMINATION COUPON

McGRAW-HILL BOOK CO., INC., 330 W. 42 St., N.Y.C. 18, N.Y.

Send me for ten days' free examination the AMERICAN MACHINISTS' LIBRARY. If satisfactory I will send you $3.75 and $4.00 monthly until the price of $23.75 is paid. If not wanted I will return books postpaid.

Name .....

Address .....

City ..... Zone .... State .....

Company .....

Position ..... PSM 5-49

Learn How to HYPNOTIZE!

***Develop your personal* POWER!**

NOW . . . revealed for you . . . are the secrets of **practical hypnotism** . . . that strange, compelling force by which an expert operator can bring others under his power. He can **sway** people at will—issue commands and be obeyed—virtually cast a **spell** over his subjects. This sensational knowledge may make YOU a more dominant, masterful personality.

Illustrated* SELF-INSTRUCTION COURSE *in Useful Hypnotism

Amazing lessons in simple, easy-to-understand language. How to select a subject—how to hypnotize by telephone—**how to make money** from hypnotism—mental telepathy—stage hypnotism—self-hypnosis—how to use **modern** hypnotism to conquer inferiority complex, timidity, etc. Clear helpful pictures show operating positions, movements. **Startling low price. Satisfaction guaranteed or money back.**

COMPLETE ONLY $1.95

SEND NO MONEY! Simply pay postman $1.95 plus C. O. D. postage—or send $1.95 and we pay postage; same money-back guarantee. Order "Hypnotism Course" today! Nelson-Hall Co., 1139 S. Wabash Avenue, Dept. 2-E1, Chicago 5, Illinois.

LEARN PLASTICS AT HOME

Get 7 Big Kits with course—make useful attractive articles.

***Write for free catalog.* Approved for Vets—Non-Vets**

PLASTICS INDUSTRIES TECHNICAL INSTITUTE

1601 South Western Avenue, Dept. PS59 Los Angeles 6, California

---

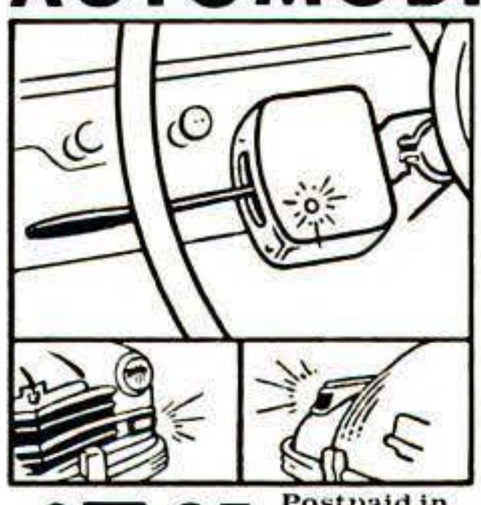
LOTS $300 LOW TERMS

In California's loveliest Garden Spot, on scenic shores of beautiful Morro Bay. Enjoy future independence with excellent soil, soft water, wonderful fishing, hunting, boating, bathing, etc. Grow fruits, vegetables, poultry. Perfect temperate climate. Congenial community. Finest investment. Free literature.

RICHARD S. OTTO

Dept. PS San Luis Obispo, California

AUTOMOBILE DRIVERS



Flash Your Turns

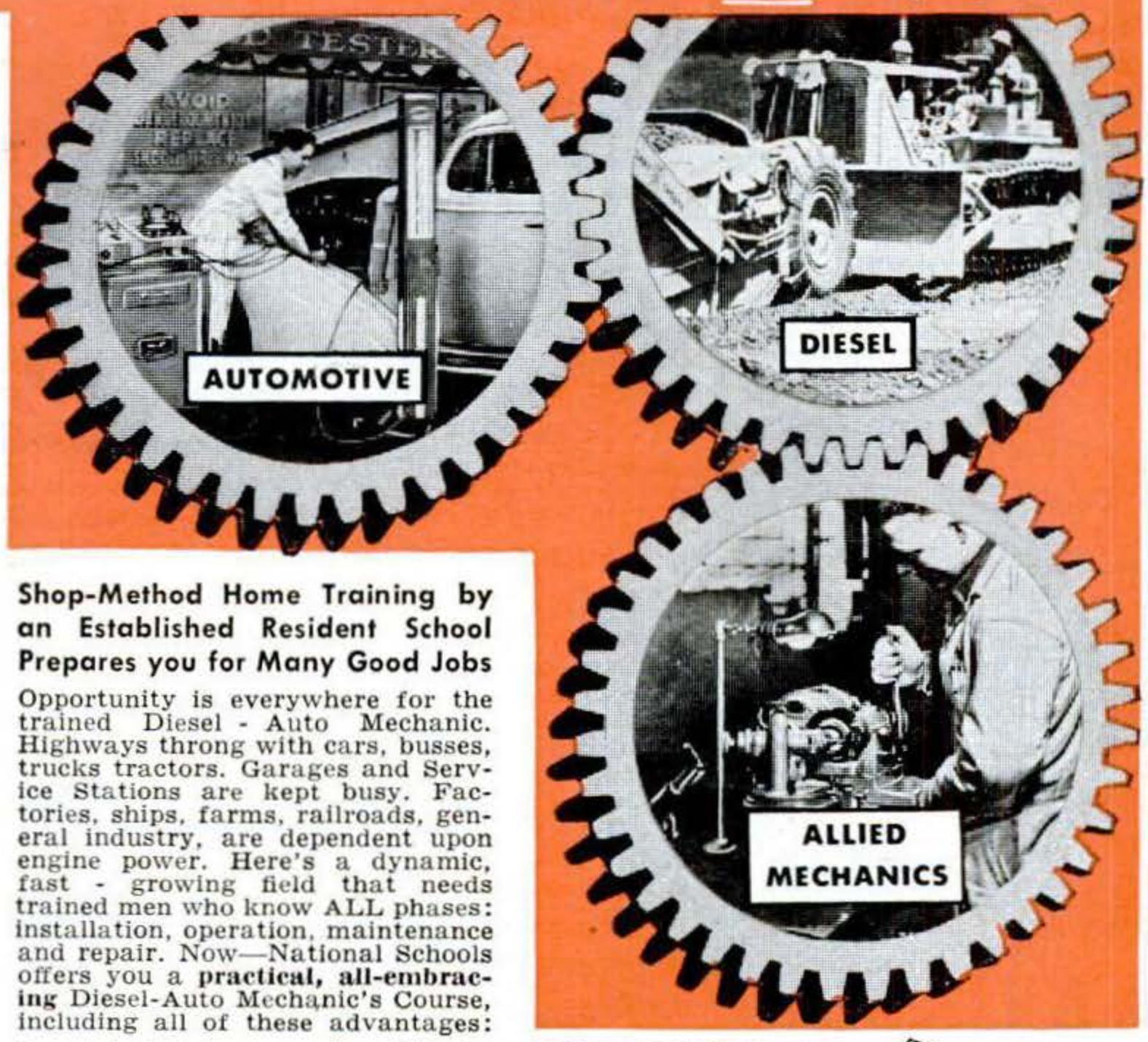
New Model SIMPLEX TURNING SIGNAL KIT fits most cars. Gives new safety and comfort when making turns. Eliminates arm signals. Flashing parking and tail lights show other cars which way you're going to turn. Flashes 60 to 80 times a minute. Works like factory installed models on expensive cars. Does not interfere with operation of present lights. Install it yourself All parts furnished. For most 1942 to 1949 cars, SPECIFY MAKE AND YEAR. Adaptable to earlier cars at extra cost. Money back guarantee.

$7.95 Postpaid in U.S. Send check or money order. Postage extra on C.O.D.'s.

The LESTER Company
P. O. Box 5939-S5
Chicago 7, Ill.

Copyrighted material

GET INTO DIESEL-AUTO MECHANICS *Master All Phases*



JOBS LIKE THESE ARE AVAILABLE TO TRAINED MECHANICS. CHOOSE THE FIELD YOU LIKE BEST

Get Complete Training

Diesel Fuel Injection
Automotive Motor Tune-up
Diesel Engine Rebuilding
General Garage Mechanic
Agricultural Implements
Auto Engine Rebuilding
Auto Elec. Service
Public Utilities
Parts Dealers
Bus & Truck Lines
Industrial Maintenance
Contracting & Excavating
Business of Your Own
AND MANY other similar openings.

As a National Schools graduate, you are trained for ALL opportunities in the Diesel & Auto Industries.

EARN WHILE YOU LEARN

With our practical Master Shop-Method Home Training, you study at home in your spare time. You receive Spare Time Work Lessons, which show you how to earn while you Learn . . . for extra money and experience. You Learn by DOING.

TOOLS AND EQUIPMENT

To make your training complete, we give you selected mechanic's tools and equipment, illustrated below, including all-metal tool-box — as a regular part of your instruction.

Shop-Method Home Training by an Established Resident School Prepares you for Many Good Jobs

Opportunity is everywhere for the trained Diesel - Auto Mechanic. Highways throng with cars, busses, trucks tractors. Garages and Service Stations are kept busy. Factories, ships, farms, railroads, general industry, are dependent upon engine power. Here's a dynamic, fast - growing field that needs trained men who know ALL phases: installation, operation, maintenance and repair. Now—National Schools offers you a **practical, all-embracing** Diesel-Auto Mechanic's Course, including all of these advantages:

Complete training, covering—Diesels, High Speed and Heavy Duty; Semi-Diesels, Gasoline and Special Fuel Engines AND Allied Mechanics.

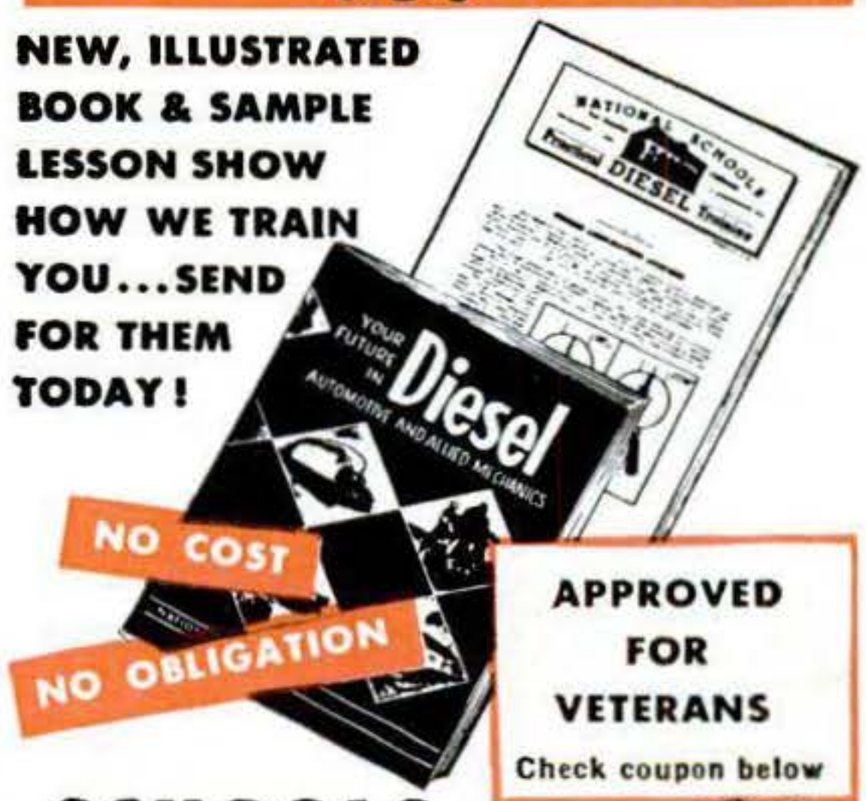
Basic Lesson Texts
Diesel Installation
Operation—Maintenance
Diesel Chart Manual
Spare Time Lessons
Engine Service Manuals
Engine Repair
Drive Systems
Diesel Electric Power
Thermodynamics

TOOLS AND EQUIPMENT

INVESTIGATE

Secure Full Information

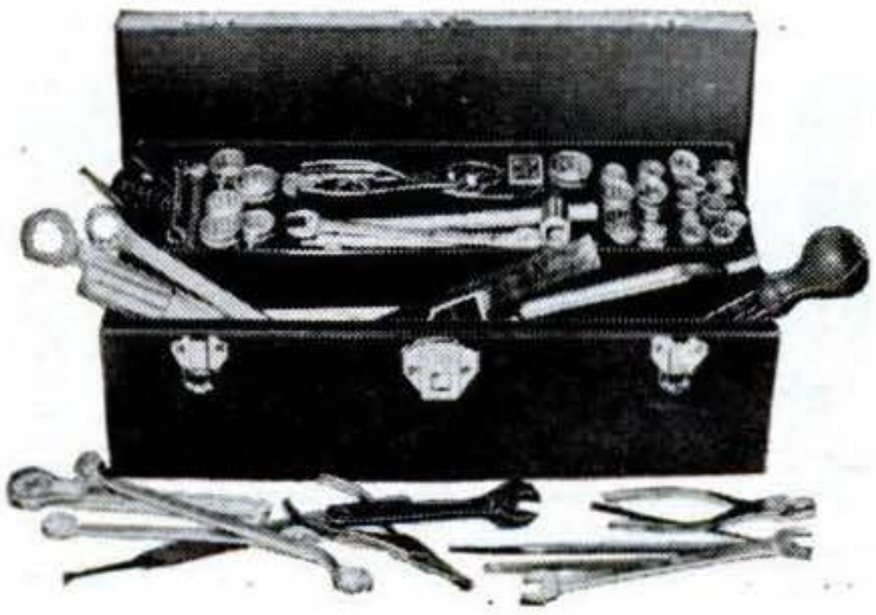
NEW, ILLUSTRATED BOOK & SAMPLE LESSON SHOW HOW WE TRAIN YOU...SEND FOR THEM TODAY!



NO COST
NO OBLIGATION

APPROVED FOR VETERANS
Check coupon below

WE GIVE YOU TOOLS OF YOUR TRADE



NATIONAL SCHOOLS
LOS ANGELES 37, CALIF. • EST. 1905

FIND OUT NOW... MAIL COUPON TODAY

NATIONAL SCHOOLS, DEPT. 5-PSD
4000 South Figueroa Street
Los Angeles 37, California

(Mail in envelope or paste on penny postcard)

Mail me FREE the book, YOUR FUTURE IN DIESEL-AUTO MECHANICS, together with the Sample Lesson. I understand I may keep and use the information with no obligation.

Name.....Age.....

Address.....

City.....Zone...State.....

☐ Check here if Veteran of World War II

Copyrighted material

HIGH PAY JOBS

FOR MEN WHO QUALIFY IN DIESEL

ASSURE YOUR FUTURE. Steady, big pay jobs await men qualified in Diesel, Tractor and Heavy Equipment. Can you take advantage of Diesel job and advancement opportunities in this fast-growing field?

COMPLETE DIESEL COURSE AVAILABLE. If you are ambitious and want to get ahead in this lucrative field, you'll want to know about the complete training in Diesel provided by Interstate. Trains you at home in spare time. Does not interfere with your present job. Covers all phases of operation. Up to the minute. Revised regularly to cover new developments. Free placement advisory service.

YOU OWE IT TO YOURSELF

to investigate I.T.S. home Diesel training. Thousands of students agree it has helped them to better jobs . . better pay. It can do the same for you!

SEND FOR FREE BOOK TODAY!

We'll gladly send you our big 24-page book *"Getting Ahead In Diesel"* FREE! Paste coupon on penny card and mail to

INTERSTATE TRAINING SERVICE
4035 N. E. Sandy, Portland 13, Oregon

Please see that I receive FREE BOOK "Getting Ahead In Diesel":

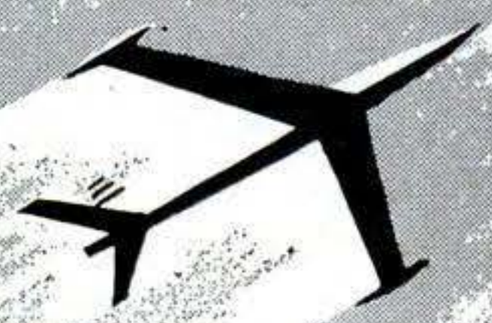
Name_____ Age____

Address_____

City_____ Zone____ State_____ F-2

STUDY

AVIATION



BUILD YOUR FUTURE IN THE *Fastest Growing* INDUSTRY . . .

SUCCESS IS *Speedier*, TOO . . .

Increase your earnings. Train for a successful career at this internationally-famous aeronautical school. Government Approved and industry recognized. You learn on "live" aircraft—the same type you will work on after graduation.

Complete, thorough courses in Engineering, Flight, Mechanics, Radio and Electronics, Meteorology, Airport Management and Operations, Instruments, Link Trainer and Parachutes.

Spartan's 21 years of experience is your assurance of getting the greatest amount of training in the shortest possible time.

Investigate the many opportunities and the training required.

SPARTAN
SCHOOL OF AERONAUTICS
TULSA, OKLAHOMA

FREE Catalog and Aviation Career Studies.

MAIL COUPON TODAY

Spartan School of Aeronautics
Tulsa, Oklahoma Dept. PS-59

Please send me complete information on: Course_____

Name_____ Age____

Street_____

City_____ State_____

SHOE REPAIR OFFERS BIG INCOME

LEARN IN 12 WEEKS TIME

You can own your own shop or earn big income as skilled shoe repairman. Growing demand everywhere at top wages for men who know how. We teach you quickly by actually working on shoes and modern machines. School open to all from 18 to 60 years of age. **Free Big 20 Page Book** explains everything. Send for your copy today.

MODERN SHOE REBUILDING SCHOOL

Approved for Vets. *Established 1927* **Dept. PS**
2937 Belmont Ave., Chicago 361—12th St., Oakland, Calif.
806 So. Figueroa St., Los Angeles 14, Calif.

ZIPSCOOT $49.75

America's Outstanding Scooter Value! This smart looking speedster is easily and quickly assembled from our factory finished kits. Uses standard gasoline motor. Speeds up to 30 miles per hour. 100 miles per gallon of gas. Send 25 cents for assembly information, drawings, and illustrations. Kits available for immediate shipment.

Zipscoot Company, Toledo 6, Ohio

FOR FUN! ***FOR PROFIT!***

LEATHERCRAFT

Make your own Leather Novelties, Belts and Bags in spare time. A hobby you will love. Complete kits and equipment for tooling, carving and embossing at very low cost. Send 15c for catalog describing tools, leathers and instructions. Your 15c refunded on 1st order.

JONAS HANDCRAFT (Dept. S-2)
32 FRANKFORT ST. NEW YORK 7, N. Y.

NEW! ADVERTISING MACHINE

PRINTS & ILLUSTRATES PENNY POST CARDS

Easy to boost sales with *Cardmaster*. Thousands are doing it. Not a toy but a sturdy Advertising Machine *Guaranteed 5 years*. Get money-making facts today. Act now!

FREE An Illustrated Book of New Plans, Business Getting Ideas for your own business. Get it.

Cardmaster, 4546 Ravenswood, Dept. 165, Chicago 40

Now! LEARN ADVERTISING!

Get where the BIG MONEY is!

FOR BEGINNERS!
No previous training required
Only $6.50 complete

Based on what can be learned quickly from this big 842-page book you can train for one of the most glamorous, most interesting careers of all—Advertising!

RADIO—TELEVISION—PUBLICATION
MAIL ORDER—COPY—LAYOUT—ART

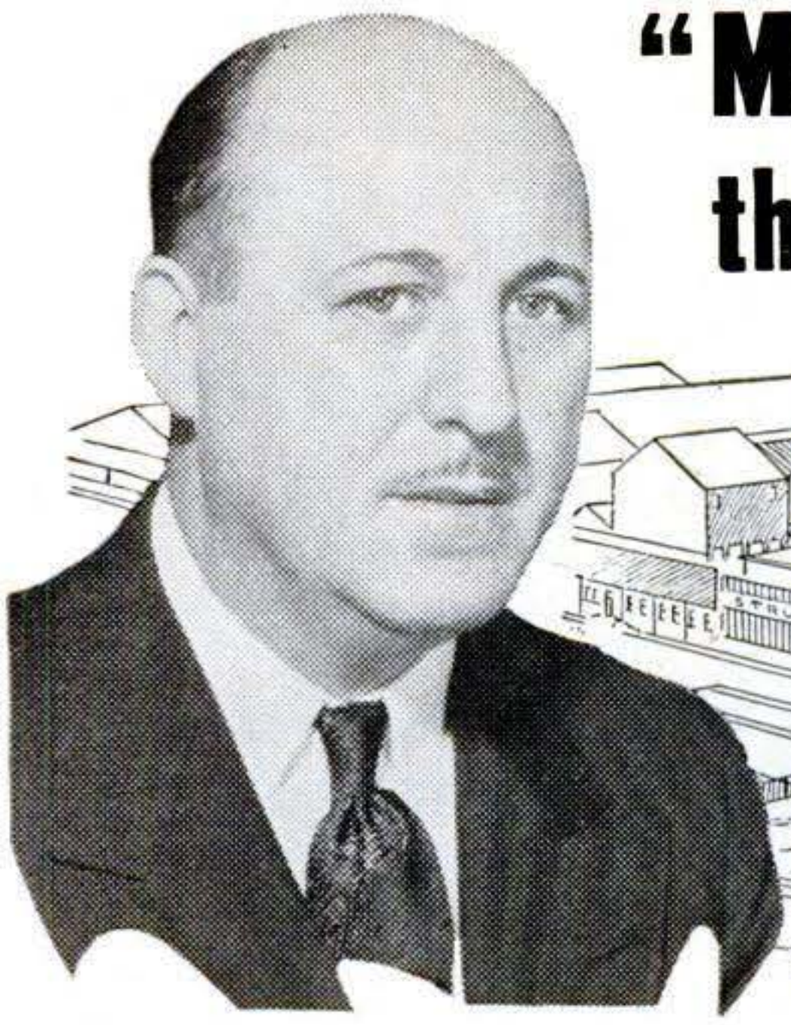
Written by Harry Bridge, president of the Bridge Advertising Agency, **PRACTICAL ADVERTISING** contains down-to-earth guidance to fit you for a good job, for part-time free lance work, or for a profitable advertising business of your own. In addition to the above fascinating subjects, you learn house organ editing, typography, printing processes, catalogs, displays, packaging, research and dozens more. Review questions, assignments and 300 illustrations help you learn fast—**and right!**

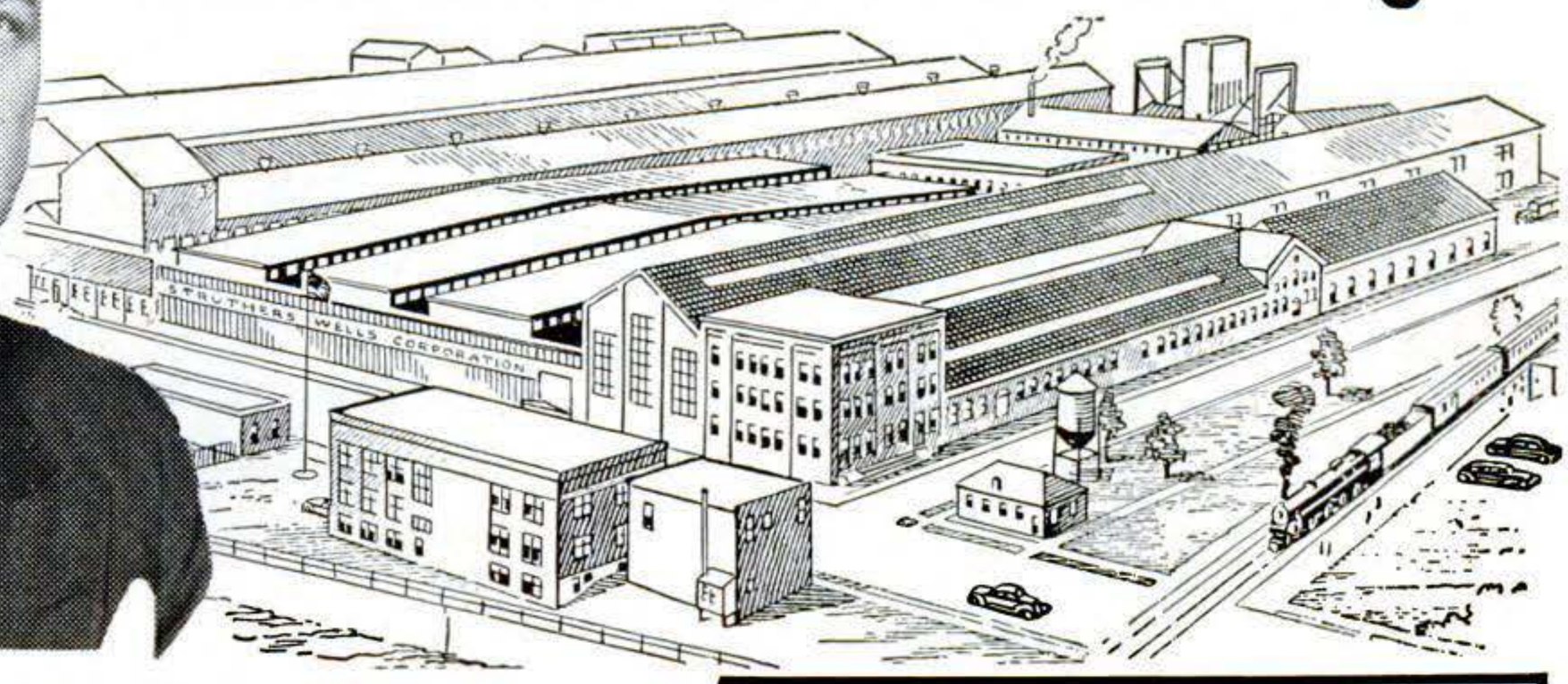
10-DAYS' FREE TRIAL! Just write your name and address in margin and mail. We'll send **PRACTICAL ADVERTISING** and, after 10 days, you can send us only $6.50 plus a few cents postage or return book postpaid. Postage paid on cash orders—same return privilege.

Dept. PS-59, Murray Hill Books, Inc., 232 Madison Avenue, New York 16, N. Y.

Copyrighted material

"Many of our key men owe their success to I.C.S. training"





C. W. JENSEN, ***General Superintendent***
Struthers Wells Corp.
Warren, Pa.

The Struthers Wells Corporation makes custom-built industrial equipment—specializes in precision and accuracy. The skill and training of the Struthers Wells engineers, designers, craftsmen are reflected in the quality of the work they turn out. It's significant that a high percentage of these men received their training through International Correspondence Schools. Their records of success prove the worth of this sound, practical training.

The same opportunity is open to you. If you have ambition, foresight, normal intelligence—I. C. S. can help you get ahead. The first step is to mail the coupon below. Do it now!

"We have five engineering departments and the heads of four of them are I.C.S. men.

"I.C.S. has trained 33 per cent of our engineers and draftsmen.

"85 per cent of our shop supervisors have studied I.C.S. courses.

"12 per cent of all employees in this plant are I.C.S. students or graduates."

INTERNATIONAL CORRESPONDENCE SCHOOLS

ICS

BOX 7630-M, SCRANTON 9, PENNA.

Without cost or obligation, please send me full particulars about the course BEFORE which I have marked X:

Air Conditioning and Plumbing Courses
- ☐ Air Conditioning
- ☐ Heating
- ☐ Plumbing
- ☐ Refrigeration
- ☐ Steam Fitting

Chemistry Courses
- ☐ Chemical Engineering
- ☐ Chemistry, Analytical
- ☐ Chemistry, Industrial
- ☐ Chemistry, Mfg. Iron & Steel
- ☐ Petroleum Refining
- ☐ Plastics
- ☐ Pulp and Paper Making

Civil Engineering, Architectural and Mining Courses
- ☐ Architecture
- ☐ Architectural Drafting
- ☐ Bridge and Building Foreman
- ☐ Building Estimating
- ☐ Civil Engineering
- ☐ Coal Mining
- ☐ Contracting and Building
- ☐ Highway Engineering
- ☐ Lumber Dealer
- ☐ Reading Structural Blueprints
- ☐ Sanitary Engineering
- ☐ Structural Drafting
- ☐ Structural Engineering
- ☐ Surveying and Mapping

Communications Courses
- ☐ Electronics
- ☐ Practical Telephony
- ☐ Radio, General
- ☐ Radio Operating
- ☐ Radio Servicing
- ☐ Telegraph Engineering

Electrical Courses
- ☐ Electrical Drafting
- ☐ Electrical Engineering
- ☐ Electric Light and Power
- ☐ Lighting Technician
- ☐ Practical Electrician

Internal Combustion Engines Courses
- ☐ Auto Technician
- ☐ Aviation
- ☐ Diesel-Electric
- ☐ Diesel Engines
- ☐ Gas Engines

Mechanical Courses
- ☐ Aeronautical Engineer's, Jr.
- ☐ Aircraft Drafting
- ☐ Flight Engineer
- ☐ Forging
- ☐ Foundry Work
- ☐ Heat Treatment of Metals
- ☐ Industrial Engineering
- ☐ Industrial Metallurgy
- ☐ Machine Shop
- ☐ Mechanical Drafting
- ☐ Mechanical Engineering
- ☐ Mold-Loft Work
- ☐ Patternmaking—Wood, Metal
- ☐ Reading Shop Blueprints
- ☐ Sheet-Metal Drafting
- ☐ Sheet-Metal Worker
- ☐ Ship Drafting
- ☐ Ship Fitting
- ☐ Tool Designing
- ☐ Toolmaking
- ☐ Welding Engineering
- ☐ Welding—Gas and Electric

Railroad Courses
- ☐ Air Brake
- ☐ Car Inspector
- ☐ Diesel Locomotive
- ☐ Locomotive Engineer
- ☐ Locomotive Fireman
- ☐ Locomotive Machinist
- ☐ Railroad Section Foreman

Steam Engineering Courses
- ☐ Boilermaking
- ☐ Combustion Engineering
- ☐ Engine Running
- ☐ Marine Engineering
- ☐ Steam Electric
- ☐ Steam Engr.

Textile Courses
- ☐ Cotton Manufacturing
- ☐ Loom Fixing
- ☐ Rayon Weaving
- ☐ Textile Designing
- ☐ Woolen Manufacturing

Business and Academic Courses
- ☐ Accounting
- ☐ Advertising
- ☐ Bookkeeping
- ☐ Business Administration
- ☐ Business Correspondence
- ☐ Certified Public Accounting
- ☐ Commercial
- ☐ Commercial Art
- ☐ Cost Accounting
- ☐ Federal Tax
- ☐ First Year College
- ☐ Foremanship
- ☐ French
- ☐ Good English
- ☐ High School
- ☐ Higher Mathematics
- ☐ Motor Traffic
- ☐ Postal Civil Service
- ☐ Retailing
- ☐ Retail Store Management
- ☐ Salesmanship
- ☐ Secretarial
- ☐ Sign Lettering
- ☐ Spanish
- ☐ Stenography
- ☐ Traffic Management

Name_____ Age_____ Home Address_____

City_____ State_____ Working Hours_____ A.M. to_____ P.M.

Present Position_____ Employed by_____

Length of Service in World War II _____

Special tuition rates to members of the Armed Forces. Enrollment under G.I. Bill and P.L. 16 approved for World War II Veterans.
Canadian residents send coupon to International Correspondence Schools Canadian, Ltd., Montreal, Canada.

Copyrighted material

LEARN Radio TELEVISION ELECTRONICS

Get a Good Pay Job – or Start Your Own Business

Want to make *more* money? Want to be your *own* boss – have your own money-making business – with your future *assured?* Then learn Radio and Television with my proven two-way method (lesson instruction plus actual practice) that can help you get into this great and growing business *quicker*. You learn by doing, right in your home in spare time. During your training you get 10 big kits of radio parts with which you perform hundreds of tests and experiments, build scores of circuits and testers to help you learn faster, more thoroughly.

Since 1929 I have been training men all over the world for success in radio, television and electronics. To learn how I can help *you too*, take the first step *now* by sending for my big 56-page illustrated book that tells how you may cash in on radio and television's *big opportunities*. My book is Free but it may mean your future success. Send coupon for it today.

APPROVED FOR VETERANS
Check coupon

C. H. MANSFIELD, President
Hollywood Radio and Television Institute
810 West 6th Street, Los Angeles 14, Calif.

FREE

SEND for THIS BOOK

C. H. MANSFIELD, Pres., Dept. D-18
Hollywood Radio and Television Institute
810 West Sixth Street, Los Angeles 14, California, U. S. A.

Send me your FREE book "Your Opportunities in Radio, Television and Electronics" which explains your 2-way home study training method.
No salesman will call.

NAME _____
Please print or write plainly
ADDRESS _____
CITY _____ ZONE _____ STATE _____
If a veteran of World War II, check here ☐

CARBURETOR TOO RICH MAKES MOTORIST TOO POOR

Car owners who are wasting money and not getting proper gas mileage due to over-rich mixtures will be pleased to learn how to save gasoline by VACU-MATING over-rich mixtures. VACU-MATIC fits all cars, trucks and tractors. It is *automatic* and operates on the supercharge principle. Easily installed in a few minutes.

SALESMEN WANTED! Big Profits!
Send name, address on penny postcard for *free particulars* and how to get yours for introducing.

VACU - MATIC CO., 1434 - 1512 W. State St., WAUWATOSA, WIS.

TRAIN NOW FOR AN

AVIATION CAREER

IN SUNNY SOUTHERN CALIFORNIA

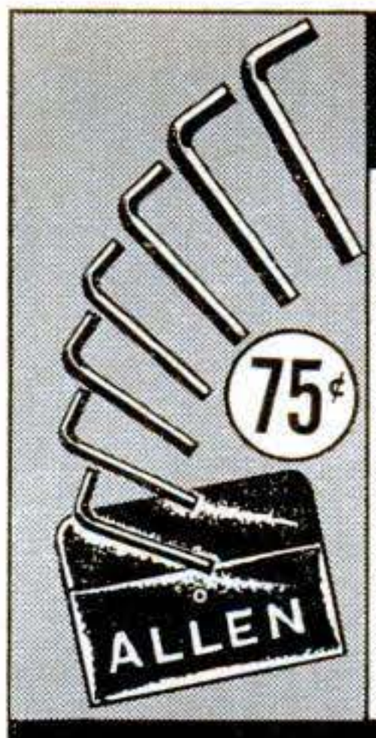
MAXIMUM TRAINING IN MINIMUM TIME

Specializing in AERONAUTICAL ENGINEERING and MASTER AVIATION MECHANICS since 1929 . . . America's Finest Aeronautical Institute . . . 7000 successful graduates . . . MAKE MORE MONEY . . . MAIL COUPON TODAY. APPROVED FOR VETERANS.
Board and Room now available.
Without obligation, send free catalogue with full information.

PS-5

NAME _____ AGE _____
ADDRESS _____
CITY _____ ZONE _____ STATE _____

CAL-AERO TECHNICAL INSTITUTE
GRAND CENTRAL AIR TERMINAL • GLENDALE 1, CALIFORNIA



YOU NEED ALLEN HEAD HEX KEYS

for the many socket screws used in shop equipment, tools, cars, appliances, farm machinery, radio and hobbies. Get the tested best in Allen marked kits made by the originators of Allen Head Screws. Have the right key when you need it. Allen key sets cost as little as 75¢ at your hardware store.

Buy ALLEN Key Sets at your hardware store

MANY NEVER SUSPECT CAUSE OF BACKACHES

This Old Treatment Often Brings Happy Relief

When disorder of kidney function permits poisonous matter to remain in your blood, it may cause nagging backache, rheumatic pains, leg pains, loss of pep and energy, getting up nights, swelling, puffiness under the eyes, headaches and dizziness. Frequent or scanty passages with smarting and burning sometimes shows there is something wrong with your kidneys or bladder.

Don't wait! Ask your druggist for Doan's Pills, a stimulant diuretic, used successfully by millions for over 50 years. Doan's give happy relief and will help the 15 miles of kidney tubes flush out poisonous waste from your blood. Get Doan's Pills.

WHAM-O
SPORTSMAN*
Powerful — New — Accurate
Kills Rabbits, Squirrels, Etc.
Routs Pests

$1.00 Postpaid

Rivals Archery!
Fast Becoming a Major Sport.
Handy - Silent - Inexpensive. Easy to use.
Complete with 40 pellets and extra rubber straps.
WHAM-O MFG. CO., Box 92H, South Pasadena, Calif.
*Professional model used by members Nat'l Slingshot Assoc.

Heavy duty

EVERYTHING IN PLASTICS AT ONE PLACE!

Sheets—Rods—Tubes. Cements, Dyes, Carving Drills—Supplies, etc. Casting Plastics. Everything you need. *Write for Free Catalog.*

FRY PLASTICS COMPANY
7608 South Vermont Avenue, Los Angeles 44, California

HIGH POWER TELESCOPE

60 POWER—ALUMINUM TUBES—LENGTH OPEN 33"

Brings distant objects 60 times as close. Eyepiece adjustable to 3 different magnifications, 15X, 30X and 60X.

$4.50

Leather Case Included

All 5 tubes made of hardened aluminum. 4 precision lenses. Also used as powerful microscope. Directions included. Money back guarantee. Only $1.50 postpaid.

BROWNSCOPE CO. Dept. 5P, 24 W. 45th St. NEW YORK 19, N. Y.

Copyrighted material

PAINT YOUR CAR

2 FULL COATS for ONLY $2.95

ONE QUART DOES ENTIRE JOB

or any other Metal or Wood Surface

WITH **WYPE** TRADE MARK REG.

NO SPRAYING · NO MASKING · NO BRUSHING

AMAZING NEW BRUSHLESS AUTO ENAMEL

You *JUST WIPE ON* with a POWDER PUFF instead of Brushing or Spraying

Dries Dust Free One Hour · No Streaks or Lapmarks

Get Beautiful Mirror-Like Finish That Looks Like Spray Job!

No previous car-painting experience necessary. You get a beautiful high-gloss job that gives you an expensive finish such as is sprayed on by Professional Auto Painters. With WYPE you need **NO** BRUSH, **NO** SPRAY, **NO** MASKING! Just **WIPE ON** with Powder Puff — which we furnish at no extra charge. You get a brilliant, glossy finish that is truly "factory-like." No streaks. No lap-marks. Guaranteed for TWO years not to crack, peel, chip or fade, if simple directions are followed. Takes about an hour to apply. Dries dust-free in an hour. WYPE comes in most popular shades. Goes over any other color, lacquer or enamel.

MOST POPULAR COLORS

Black	Brewster (dark) Green
Maroon	Jewel (light) Green
Red	Washington (dark) Blue
Gray	Monticello (light) Blue
White	Sun Beige (light) Tan

$2.95 PER QUART

$1.75 a Pint—2 pints Do a 2-Tone Job

SEE YOUR DEALER or ORDER DIRECT
SEND NO MONEY • Get WYPE Today!

If your dealer can't supply you, just send us a postcard. We'll ship C.O.D. Just pay mailman for Wype, plus postal charges. Or send remittance with order and WE pay postage.

NO OTHER PRODUCT Gives You This Protection

The **ONLY Brushless Enamel CERTIFIED** by U.S. Testing Co., Inc. WORLD-FAMOUS Testing Laboratory and found to conform to the claims and guarantee of the Wype Corporation. U. S. Testing Co. is the largest impartial testing laboratory of its kind, and conducts scientific tests for the world's foremost companies. Before you buy any automobile paint, ask for proof that it has passed tests by a nationally-known testing laboratory whose name is given in the advertising. You're SURE you are SAFE when you paint with WYPE.

2-YEAR GUARANTEE
We Guarantee WYPE against cracking, peeling, fading or chipping for two years after application, if applied according to directions furnished. Your money cheerfully refunded if WYPE does not live up to this Guarantee.

COPYRIGHT, WYPE CORP.

APPLY in ONE HOUR — DRIES to GLISTENING PROFESSIONAL FINISH

WYPE is a new Miracle Enamel for Autos. It is NOT a wax or polish but a hard high lustre ENAMEL finish! With WYPE, ANYONE can do a beautiful job! Order a quart to paint your car or to get started in this BIG-MONEY Business!

NO STREAKS OR LAPMARKS LOOKS LIKE SPRAY JOB

Hundreds of other uses for WYPE!

Paint Anything At Home

Repaint outdoor & indoor furniture, bicycles, hardware, damaged white enamel stoves, refrigerators, etc., and any other article of steel or wood.

DEALERS & JOBBERS WANTED Write Today

Some of the FAMOUS DEPARTMENT STORES that Sell WYPE

VISIT or PHONE THE STORE IN YOUR CITY . . .
If you live in one of the cities shown here, it will be more convenient to buy from your favorite department store. Ask your dealer! Leading merchants and gas stations everywhere sell WYPE.

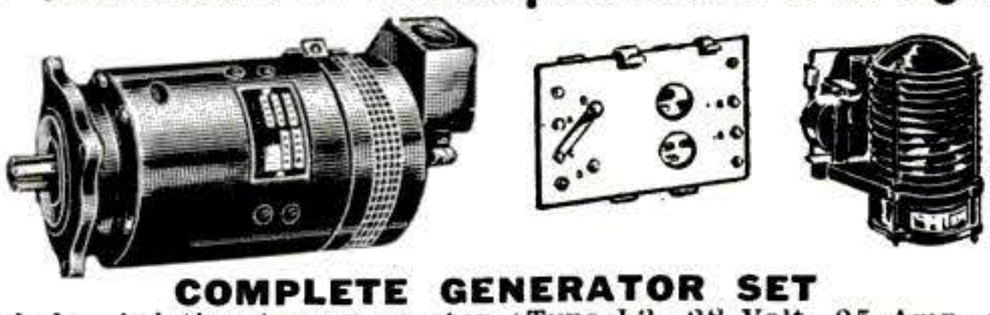
Akron: M. O'Neil Co.; **Baltimore:** May Co.; **Boston:** Jordan Marsh Co.; **Buffalo, N. Y.:** J. N. Adam & Co.; **Chicago:** Goldblatt's 15 Dept. Stores (Goldblatt's, also, at Joliet, Ill.; Hammond, Gary & South Bend, Ind.); **Cincinnati:** Fair Store Co.; **Cleveland:** May Co.; **Columbus, O.:** F. & R. Lazarus Co.; **Dallas:** Sanger Bros., Inc.; **Denver:** May Co.; **Detroit:** People's Outfitting Co.; **Ft. Worth:** W. C. Stripling Co.; **Grand Rapids, Mich.:** Herpolsheimer Co.; **Hackensack, N. J.:** Packard-Bamberger Co.; **Houston:** Foley's; **Indianapolis:** Wm. H. Block Co.; **Kansas City, Mo.:** Jones Store Co.; **Los Angeles:** May Co.; **Louisville:** Kaufman-Straus Co.; **Memphis:** B. Lowenstein & Bros.; **Milwaukee:** Ed. Schuster & Co., Inc.; **Minneapolis:** Donaldson's; **New Orleans:** Maison Blanche Co.; **Newark, N. J.:** Bamberger's; **New York:** Gimbel's; **Omaha:** J. L. Brandeis & Sons.; **Philadelphia:** Lit Brothers; **Pittsburgh:** Kaufmann's; **Portland, Ore.:** Meier & Frank; **Providence, R. I.:** The Shepard Co.; **Richmond, Va.:** Miller & Rhoads, Inc.; **Rochester, N. Y.:** Sibley, Lindsay & Curr; **St. Louis:** Famous-Barr Co.; **St. Paul, Minn.:** The Golden Rule; **San Antonio:** Joske's of Texas; **San Diego:** Whitney's; **San Francisco:** Hale Bros. (Also Hale Bros., Oakland and San Jose); **Seattle:** The Bon Marche; **Spokane:** Spokane Dry Goods Co.; **Syracuse, N. Y.:** Dey Bros. & Co.; **Toledo:** Lion Dry Goods Co.; **Warren, O.:** Griswold's; **Washington, D. C.:** Lansburgh & Bro.; **Youngstown, O.:** Strouss-Hirshberg Co. Also—**Chicago:** Wieboldt Stores, Inc.; **Little Rock, Ark.:** The Gus Blass Co.

WYPE CORP. Dept. 17-E 2214 DOLMAN ST. ST. LOUIS 4, MO.

Copyrighted material

WAR SURPLUS BARGAINS

"The Bottom of the Surplus Barrel is in Sight"



COMPLETE GENERATOR SET

Includes Aviation type generator (Type L3, 28 Volt, 25 Amp. rotation CW, 2500 RPM) measures 12 x 5 inches, weighs 24 lbs. Outfit also includes famous Carbon Pile type voltage regulator (AN3080-1) with mounting base for same. Holds voltage within given operating range at varied generator speeds. Complete set, generator, regulator and base (all like new) now offered at approx. 10% of AAF acquisition cost. Complete set only $24.50. Generator only (shp. wgt. approx. 35 lbs.) only **$17.50**

PORTABLE FOOD WARMER KIT

Used by AAF for warming liquids, food, etc. Operates on 110 V. AC or 28 V. DC. Keeps foods hot for hours. Case measures 11 x 17 in. Equipment includes 6 4½ in. stainless steel cups with lids, 4 stainless food trays or plates with lids, 6 each knives, forks, spoons, 1 water container, plugs, etc. Use at home, on boats, planes, etc. to warm canned goods, etc. and to keep them warm. May be packed with dry ice to keep things cold. Use also on hunting and fishing trips, picnics, etc. Shp. wgt. approx. 35 lbs. Complete, only **$19.95**

LIGHT PLANT "HOMELITE" PORTABLE

A complete, self powered portable light plant of 14 V. DC; 1000 watts. Powered by approx. 3 H.P., air cooled gas engine. Complete with meter, etc. Mounted on pneumatic tired wheels and dolly. Crated and guaranteed like new. (Shp. wgt. approx. 115 lbs.) Each only..... **$74.50**

NAVIGATOR'S CELESTIAL SEXTANT

Link A-12 type, good serviceable condition; in carrying case, instructions, navigation study book (AAF), etc. (Shp. wgt. 9 lbs.) Reduced to less than 10% of AAF cost. Now only..... **$14.95**

AUTOMATIC RADIO DIRECTION FINDER

Bendix, type SCR269G (AAF), receiver type 433G. The famous ADF set used to guide vessels and aircraft throughout the world (simplest form of navigation known to man). Turn set on, tune to station you wish to navigate to (frequency 200—1750 KC, includes marine beacons, aircraft beacons with weather, all broadcast stations); then "follow the electronic needle into port". This set is complete in every detail with all componants needed. Installed it weighs 85 lbs. Reception is wide, tone clear. Operates from 24—32VDC aircraft or boat power. Sets are perfect but used, bench checked and operated prior to shipment. Complete with full instruction booklet, diagrams, not wired up to plugs (wire not furnished). Now selling at 5% of cost. (Shp. wgt. approx. 100 lbs.) Reduced to only..... **$124.50**

AERO MAGNETIC COMPASS

Panel mounting type, made by Pioneer. Original cost approx. $75.00. New, reduced to only..... **$5.95**

AIR COOLED AIRPLANE ENGINE

6 cyl. in-line inverted, Ranger Mfg.; 175 H.P., net weight approx. 375 lbs. Engines are new, in factory box with tools, two magnetos, (no carburetors) etc. Total shp. wgt. approx. 750 lbs. Original cost over $3000. To close out balance of stock, reduced from $495 to **$295.00**

Send check or money order. All F.O.B. Houston. Can ship mail, express or freight, transportation charges collect. Order today while these bargains are available.

AERO PARTS SUPPLY, Dept. PS5
MUNICIPAL AIRPORT HOUSTON 17, TEXAS

Pioneers **AIR RIFLES** **BENJAMIN** **AIR PISTOLS** Leaders

WITH SAFETY LOCK

SEND FOR FREE FOLDER OF LATEST MODELS TODAY

If you want a **REAL GUN** for **PRACTICAL USE** inside or outdoors, get a **SAFE—CLEAN—ECONOMICAL—BENJAMIN** with Adjustable Power and Amazing Accuracy. Use **BENJAMIN H-C PELLETS** for **BEST RESULTS** in all rifled models. **WRITE AT ONCE.**

BENJAMIN AIR RIFLE CO., 811 MARION ST., ST. LOUIS 4, MO.

EXPORT PAYS BIG

Large World Trade firm offers men and women quick preparation for big pay positions or unlimited-profit businesses of their own. Mail order World-wide without capital, from home; or travel abroad. Represent manufacturers. Past experience not needed. Write today for FREE BOOK. State if veteran. Airmail reaches us over night.

Mellinger Co., 1422-FO Westwood Blvd., Los Angeles 24, California

---

Learn **FINGERPRINTING AND IDENTIFICATION**

IN YOUR OWN HOME IN YOUR SPARE TIME

Specially prepared correspondence courses make it easy to learn this fascinating study essential in the field of CRIME DETECTION.

FREE Booklet On Request

Under the Private Correspondence School Law of Pennsylvania, Licensed by the Dept. of Public Instruction.

PENNA. INSTITUTE OF CRIMINOLOGY

Dr. W. Nisson Brenner, Director
DEPT. NO. 18
Extension Division
135 So. 2nd Street
Philadelphia 6, Pa.

CODE SPEED SHORT CUT

Be a code expert. Learn to be an Amateur or Radio Operator the newer, streamlined way—the Candler way. Qualify for amateur or commercial license. Have skill and speed in sending and receiving code this easy, faster method. Intensely interesting hobby or profitable occupation. You can learn at home or wherever you are, quickly, easily with the famous Candler Speed System—the System that makes champions. Send for book of particulars **FREE.**

CANDLER SYSTEM CO., Dept. 6-E, Box 928, Denver, Colo., U.S.A.

---

make your own *Gems* 29.50 F.O.B

All necessary lapidary equipment is furnished, including a super-charged diamond blade for sawing, and all wheels for grinding, shaping and polishing; also complete instructions. The complete equipment as shown, less motor and belt, for only $29.50, f.o.b., Burlington, Wisconsin. Write today for information and literature.

B&I MANUFACTURING CO.,
Dept. M Burlington, Wis.

Save on CIGARETTES

Chesterfield, Lucky Strike, Old Gold, Camel, Philip Morris, Tareyton, Raleigh, Kools, etc. **$1.58** Carton of 10 packs

All postage and insurance PAID to any point in the U. S. on 5 cartons or more. Send remittance with order. Write for complete list.

JOE SMITH SALES COMPANY

P. O. Box 1025 Department POS Joplin, Mo.

LEARN CARTOONING

IN SPARE TIME— by Easy PICTURE CHART METHOD!

Same Simplified Method that has helped train creators of "Steve Canyon," "Winnie Winkle," "Out Our Way," "Secret Agent X-9," "The Neighbors," "Reg'lar Fellers," "Strange As it Seems," and many others. Send for descriptive literature, and full details. (Please state age.)

LANDON SCHOOL OF CARTOONING
4925 Cleve. Transit Bldg., Cleveland 14, Ohio

HOW'S YOUR OIL? Sensational New **FILTER METER** Tells At A Glance

The condition of your oil. Is it clean? Does the filter need changing? Amazing new FILTER METER ends guessing—tells at sight everything you should know about the oil in your car. Protects the engine—saves money. A scientific, precision-made instrument that reveals the flow and condition of your oil. Simple, sturdy, long-lived. Can be easily installed by anyone. Attaches to oil filter—fits FRAM, AC, PUROLATER and all standard filters. Check, money order or C.O.D.

Postpaid Only **$3.95**

HUNTER & CO., 1552 E. 17th St., Cleveland 14, Ohio

Copyrighted material

The Success Story of Bill Smith... OR YOU!

Mails coupon to National Schools in Los Angeles, and receives Free Lesson and book of information about Radio, Television and Electronics training.

Enrolls . . . studies in spare time. Finds personal attention from instructors, interesting material and practical equipment, all increase his interest.

Builds actual units as part of Course. Earns money doing spare time repair and installation work.

Completes Course and receives Diploma . . . is now a qualified Radio, Television and Electronics Technician.

Applies for—and GETS—a good pay, full time job in industry. Finds that employers know National Schools and like to hire their graduates.

Or he opens own profitable Service Shop, with valuable counsel and aid from National Schools. Now for real happiness and success!

GET INTO RADIO, TELEVISION and ELECTRONICS by NATIONAL SCHOOLS SHOP METHOD HOME TRAINING

THIS PRACTICAL, TECHNICAL RESIDENT TRADE SCHOOL TRAINS YOU AT HOME FOR BIG RADIO OPPORTUNITIES!

Never in history has such rapid progress been made as in the great Radio, Television and Electronics Industry today! This exciting, fast-moving development means new and greater opportunities for the trained, skilled man —for *you*—in Television and Radio Broadcasting, Installing, Servicing; in Frequency Modulation; in Applied Electronics in many industries; *in a business of your own!*

National Home Training is *Practical*

Your National Schools Course fully covers basic, advanced and specialized instruction in all phases, including basic radio principles, receivers, amplifier systems, transmitters, television, aviation radio, electronics. You get complete instruction material, including shop manual, tube manual, job sheets, radio dictionary, special laboratory experiment lessons, experimental equipment. You receive complete, modern television lesson texts.

Your Home Study is supervised by our staff of highly trained instructors who daily teach our resident students here. Let the Free Books shown below tell you more about National Home Training. Use coupon today!

APPROVED FOR VETERANS

You Build This Superheterodyne Receiver With Parts We Send

You receive complete standard equipment, including latest type High-Mu Tubes, for building various experimental and test units. You progress step by step until you build a complete Superheterodyne Receiver. It is yours to use and keep.

Professional Multitester Included!

This portable instrument (see right) enables you to perform many practical tests, make delicate adjustments and do service work. Complete with test leads.

You receive a series of special laboratory experiment lessons to guide your practical exercises with your equipment. These lessons have been prepared with a special technique of illustrating radio principles by numerous easy-to-understand examples.

Both Resident and Home Study Courses Offered

Send Coupon Today for These Two Valuable Free Books

NATIONAL SCHOOLS

LOS ANGELES 37, CALIF. • EST. 1905

FIND OUT NOW... MAIL COUPON TODAY

National Schools, Dept. 5-PSR (Mail in envelope or paste on postcard)
4000 South Figueroa Street
Los Angeles 37, California

Mail me FREE the book, "Your Future in Radio," and a sample lesson of your course.

NAME..... AGE.....

ADDRESS.....

CITY..... ZONE..... STATE.....

☐ Check here if veteran of World War II

Copyrighted material

AMAZING NEW

Stubcaster®

CASTING AND TROLLING ROD

Nothing like it! Only 21" overall, yet **STUBCASTER'S** patented coil spring gives thrilling, live 5 ft. action. Breaks down to 14", so fits any tackle box. Shortened arc means greater casting accuracy, maximum distance. Reduces backlash! Cast 3 or 4 in a boat without tangling lines! Brings fish right to net—fewer losses. Especially adapted to pier-fishing or trolling. Perfect supplement to any fisherman's equipment.

$5.95 without reel

Money back guarantee! If dealer can't supply, send check or money order to

WALTCO PRODUCTS
Dept. 75-E
2300 W. 49th St., Chicago 9, Ill.

NEW! **LONGCASTER...conventional type, high quality, solid steel, casting rod blade—42" long. *Sensitive* tip action! Fits all STUBCASTER handles—only $4.95. Blade and handle (52")—$7.95.**

YOU'LL NEVER HAVE BUT ONE HEAD OF HAIR

Will You Give 3 Minutes a Day To Take Care of It?

Take advantage of this opportunity to learn more about the new electric-automatic Vitabrush that turns 20 minutes of tedious, tiresome hand brushing into just 3 minutes of restful, stimulating fun. Handy as an electric razor, Vitabrushing does these three things supremely well:

- Gets your scalp really clean, removing itching dandruff scales, accumulations, dust.
- Stimulates the life-giving blood supply in your scalp.
- Distributes the natural oils, "polishing" the hair . . . making it softer, glossier, easier to manage.

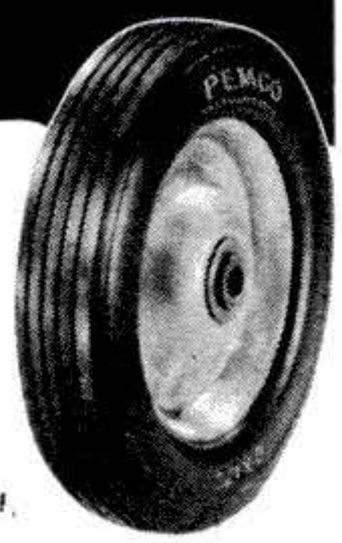
Don't delay . . . send for full information on how Vitabrush can help you in caring for your scalp and hair. Just say, "Tell me about Vitabrush." No obligation. Important—mail a penny post card NOW.

Hershey Mfg. Co., 3716 Field Bldg., Chicago 3, Ill.

BUILD *and repair 'em* YOURSELF

with PEMCO wheels

TOYS & CARTS
SCOOTERS
TRICYCLES
IMPLEMENTS
Portable FURNITURE
GARDEN GRILLS
AIR COMPRESSORS
SHOP EQUIPMENT



COMPARE THESE REDUCED PRICES!

SEMI-PNEUMATIC—LOAD TESTED

6" x 1.50", Oilite Bearings	$1.35 each
8" x 1.75", Ball Bearings	1.85 each
10" x 1.75", Ball Bearings	2.20 each
10" x 2.00", Ball Bearings	2.50 each

DEALERS AND QUANTITY BUYERS—*WRITE FOR SPECIAL PRICES!*

PARAMOUNT ENGINEERING & MFG. CO.
1872 RAVINE ROAD, KALAMAZOO, MICHIGAN

TENTS

WAR SURPLUS
ALL TYPES & SIZES
Also camping equipment
sporting & fishing supplies & rope
Low Prices! Free 24-page catalog

MOR-SAN SALES 10-17D 50th Avenue Long Island City 1, N. Y.

Like eyes in the back of your head

The New Saf-T-View Rear-View Automobile Mirror

No more blind spots because your rear-view mirror is set at the wrong angle. Turn the new Saf-T-View as you do your eyes—with the touch of a lever inside the car. Enjoy full vision, safety, convenience. Right and left-hand models. Order direct. Only **$3.95** each, **$7.50** pair, plus 25c postage and handling. No C.O.D.'s please.

SIGNAL-U-MFG. CO.
Dept. A-5
YOUNGSTOWN OHIO

RADIO ENGINEERING

Television, FM, Broadcasting, Servicing, Electronics, Aviation, Marine & Police Radio taught thoroughly. 72 weeks' Engineering course equivalent to 3 years' college radio work. Approved Veteran Training. Catalog upon request.

VALPARAISO TECHNICAL INSTITUTE
Dept. 503 Valparaiso, Ind.

WOODWORKERS . . . *Get this*

CONSTANTINE MASTER MANUAL

Get the Most Fun From Your Hobby

Indispensable to woodworkers. Newest, biggest edition, more pages, more color, helpful how-to-do-it articles, pre-war and new items, more bargains. Send 25c today and we will include ***FREE! FULL YRS. SUBSCRIPTION*** to Chips and Chats, published bi-monthly. Keeps you up-to-date on everything in woodworking, offers big money-saving bargains. Send now.

ALBERT CONSTANTINE & SON. Inc.
793-A East 135th Street, New York 54, N. Y.

SENSATIONAL! SUPPLY LIMITED!

Imported Swiss Stop **CHRONOGRAPH** with 2 push buttons

WRIST WATCH $7.70
Plus 77c Fed. Tax
WRITTEN GUARANTEE

GIVEN Handsome Leather Watchband

Tells Time • Stop Watch • measures **SPEED** • measures **DISTANCE**

7-Day Money Back Guarantee

"Wonder" Watch. Used to time autos, airplanes, horse races, athletic events. **FREE** instructions included.

PLUS 8 BIG FEATURES

• Telemeter • Chrome Plated Case • Attractive Dial • Tachometer • Unbreakable Crystal • Precision Made • Large Red Sweep Hand • Hands & Numbers Glow in Dark. Used by Engineers, Sportsmen, Doctors, Army, Navy, Airforce Officers, Navigators, Photographers. SENT ON APPROVAL. Deposit $7.70 plus tax and postage with postman or send money order, save postage. (Same money back privilege.)

THE JEWELBOX, Dept. F, 1672 Broadway, N. Y. 19, N. Y.

Copyrighted material

Learn ENGINEERING DRAFTING...BUILDING in Chicago, Industrial Hub

Approved for G.I. Training — *Time-Saving Courses* — *Day & Evening Classes*

1 YEAR • 2 YEAR
3 YEAR COURSES

BUILDING
DRAFTING
ENGINEERING
AIR CONDITIONING
REFRIGERATION
ELECTRICITY
RADIO

Get your training at Chicago Tech in the Nation's industrial center. Chicago provides unequaled opportunities for part-time employment while training and for permanent positions upon graduation. Many other cultural and recreational advantages described in Catalog—sent Free!

Chicago Tech, founded 45 years ago, has trained thousands of men now occupying important places in industry the world over. Training combines theory and practice in 1 year, 2 year, and 3 year (Degree) courses. Saving in time means earlier graduation — and consequently earlier employment.

Terms start January, April, July and October. Get information now to arrange for early admission and accommodations.

CHICAGO TECHNICAL COLLEGE
E-88 Tech Bldg.
2000 So. Michigan Ave.
Chicago 16, Ill.

MAIL COUPON TODAY

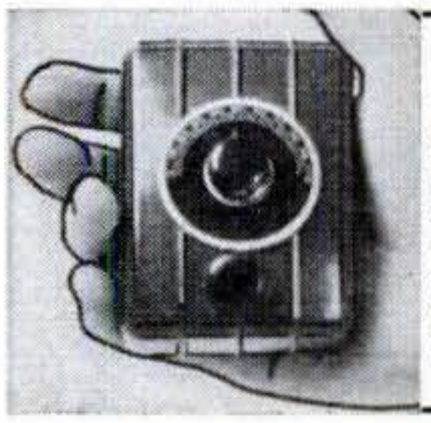
CHICAGO TECHNICAL COLLEGE
E-88 Tech Bldg., 2000 So. Michigan Ave.
Chicago 16, Ill.

Please send me without obligation free booklet on Time-Saving Technical Training.

Name.....Age.....

Address.....

City.....Zone.....State.....



Poc-Kit Pal Radio

A power packed, super-sensitive one tube beginners kit includes miniature tube, factory wound loop antenna, plastic case and all parts with simple instructions. Works on pen-lite or hearing-aid cells. All parts, tube and batteries protected inside case. Astounding results. Poc-Kit Pal less phones and batteries only $3.98 post paid. SEND $1.00 balance COD plus fee. (FOREIGN $5.00 U. S. Cash).
Lee Electronics Laboratory, Dept. 1-S, 17 E. 48th St., New York 17, New York

SAVE 1/3 ! POWERBIKE

DIRECT FROM FACTORY TO YOU

Nationally known--Makes your bike a speedy streamlined Powerbike at new low cost. Ideal for work and play! Write for FREE LITERATURE!

SAGINAW PRODUCTS CORP.
109 River St., Saginaw, Michigan

Writes on glass, metals, plastics. Hex. Aluminum 6". Money back guarantee. Agent inquiries invited.

$2.00 Postpaid

CLIPPER DIAMOND TOOL CO., INC. 21-A W. 46 St., N.Y. 19

DEPENDABLE CRAFT SUPPLIES

LEATHER CRAFT • PLASTICS • POTTERY CRAFT
BLOCK PRINTING • BELT CRAFT
TEXTILE COLORS • POWER TOOLS • WOOD BURNING
INSTRUCTION BOOKS • WRITE FOR CATALOG

DWINNELL CRAFT SHOP
Dept. PS-95 • Elm Grove, Wheeling, W. Va.

BUILD A PLAN and SAVE MONEY

Make your "dreams" live by constructing a table size model of your Dream Home. It's so simple a child can do it. No tools—No fuss. Just follow the easy directions. Hundreds of floor plans can be created to fit your own taste.
Making changes on a scale model helps save expensive mistakes when you build your real home. Furniture cutouts to scale, enable you to plan your decorating scheme and electrical outlets.

FREE (with Set)—"How To Plan The Home You Want" 32 pages full of helpful home building hints.

Only $5.75 Postpaid
Add 2% Tax in N.Y.C.
Sorry No CODs. Money Back Guarantee If Returned Within 5 Days of Receipt.

BUILD-A-PLAN, INC., Dept. PS 1150 BROADWAY NEW YORK 1, N. Y.

Copyrighted material

MORE PAY *through* HOME STUDY TRAINING *in* SPARE TIME

Do you want a better position—a larger salary? They are within your reach—now. LaSalle experts will guide you step by step in gaining business training which leads to greater earnings.

The time-saving, interesting LaSalle Problem Method helps you prepare at home, without interference with your present duties.

Simply mark on the coupon the field in which you desire success, and we will mail you a valuable book describing the opportunities in that field—plus "Ten Years' Promotion in One"—a book which has helped many men. Let us tell you how we have started thousands of average men and women on the high road to success and more money. Check and mail the coupon now.

LASALLE EXTENSION UNIVERSITY

A Correspondence Institution

417 S. Dearborn St., Dept. 583-R, Chicago 5, Ill.

Send me full information regarding the course I have marked—without obligation—plus "Ten Years' Promotion in One."

- ☐ **Higher Accountancy**
- ☐ **C.P.A. Coaching**
- ☐ **Bookkeeping**
- ☐ **Law: LL.B. Degree**
- ☐ **Business Management**
- ☐ **Salesmanship**
- ☐ **Traffic Management**
- ☐ **Foremanship**
- ☐ **Industr'l Management**
- ☐ **Stenotypy (Machine Shorthand)**

Name.....*Age*.....

Address.....

City.....*Zone*.....*State*.....

ART FOR PLEASURE AND PROFIT

Here's How You Can Learn at Home in Your Spare Time to BE AN ARTIST

Trained Artists Are Capable of Earning $60, $85 AND MORE A WEEK

COMMERCIAL ART, DESIGNING, CARTOONING—all in one complete home study course. You can become your own boss. Many students earn extra money while learning by designing posters, rendering signs, lettering, etc. W.S.A. is now in its 35th successful year. No previous art experience necessary, we teach you step-by-step. TWO ART OUTFITS included with training. FREE BOOK, "Art for Pleasure & Profit"—tells about our course, instruction, what our graduates say, and commercial opportunities in Art. Low tuition—easy terms.

VETERANS! Course G.I. Approved.

FREE BOOK gives details

Washington School of Art, Studio 135-R
1115—15th St., N.W., Washington 5, D. C.

Please send me full information and your Free Book, "Art for Pleasure and Profit."

Name.....Age.....

Street.....

City.....Zone.....State.....

☐ **I am entitled to training under the GI Bill**

WAR SURPLUS BARGAINS

$500,000.00 INVENTORY for QUICK LIQUIDATION

Surplus items—hundreds of them for home, shop, factory, farm and outdoor use. New items, used items, reconditioned items—all at tremendous savings—all priced for quick sale.

PAGE AFTER PAGE OF VALUES

This big catalog shows page after page of amazing money saving values. Write for your copy today. Send 10c to cover postage, mailing, etc. Write today!

10c

SEND TODAY FOR YOUR COPY

STARK'S

509 So. State St. Dept. PS-5 CHICAGO 5, ILL.

LEARN TO WRITE *a Good Hand!*

FOR BUSINESS AND SOCIAL SUCCESS!

Improve your handwriting at home quickly with my new instruction books just off the press. Master all the secrets of better penmanship. Simple and easy, fully illustrated, highly endorsed. Begin today. Write for: ☐ **New Free Book,** "How to Become a Good Penman", or check books wanted, $1.00 each. ☐ Business Writing ☐ Artistic Writing ☐ Card Writing ☐ Engrossing Alphabets ☐ Bird and Design Flourishing ☐ Complete Set $4.50 ☐ Enclose 10c for your name beautifully written and shading penpoint.

S. A. Ziller, President, TAMBLYN SCHOOL OF PENMANSHIP
439 Ridge Bldg. ***In Business Over 52 Years*** **Kansas City, Mo., U.S.A.**

WILL YOU WEAR THIS SUIT

AND MAKE UP TO $12.00 IN A DAY!

YOU CAN GET this fine, tailored-to-measure suit as a bonus, without paying one penny cash, by taking a few orders from friends. My plan also helps you make up to $12.00 in a day **without experience or house-to-house canvassing.** Big opportunity—full or spare time.

Send for Samples—FREE! Write today for FREE CLOTH SAMPLES and "Sure-Fire" money-making plans. For quick action write fully giving age, etc.

SEND NO MONEY. **H. J. Collin, PROGRESS TAILORING COMPANY, 500 South Throop Street, Dept. S-221, Chicago 7, Illinois**

HIGH SPEED PLASTIC CARVING DRILLS FOR INTERNAL CARVING

Use only Foredom Drills for superior results, 3/32" shank 80c, 1/8" shank $1.00. Available in standard or high-spiral types. Specify which. Postpaid on receipt of M.O. or check. Catalog of Foredom Flexible Shaft Machines, preferred by expert internal carvers, on request. NEW! Exceptionally complete book on INTERNAL CARVING. Step by step instruction, over 150 illustrations,—only $1.50.

FOREDOM ELECTRIC CO. Dept. C-105 27 Park Place, New York 7, N. Y.

Start Your Own Money-Making Business

Clean rugs on customers' floors—upholstery in their rooms—even painted walls—with highly efficient electric machines which are making big money for others and giving them independence. Write today for complete information. It's FREE!

Von Schrader Mfg. Co., R593, Racine, Wis.

LEARN RADIO-TELEVISION ACTING-ANNOUNCING!

By Practicing in Your Spare Time Announcing or Entertaining over **Your Own Radio** with this new type **Aluminum "Radio Mike"!**

12 Radio-Television Lessons Given with each "Radio Mike"—gives studies, requirements and information on how you can get a job in Radio or Television!

SEND NO MONEY Just your name and address and pay postman **$2.99** C.O.D. plus postage on arrival or send $2.99 for postpaid delivery. Easy to hook up (attaches to any radio quickly—Anyone can do it) **FULL INSTRUCTIONS GIVEN. ORDER YOUR RADIO MIKE AND LESSONS TODAY!**

MIDWAY CO. Dept. TPS-5 KEARNEY, NEBR.

Copyrighted material

MIRACLE CAR! WORLD WIDE SENSATION!!

MOST AMAZING MECHANICAL TOY CAR IN THE WORLD!

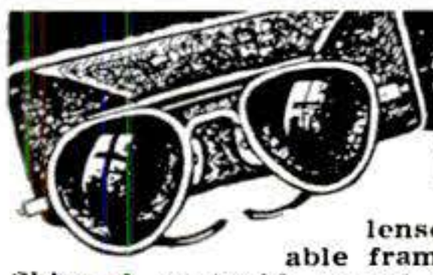
8 ALL-AUTOMATIC CONTINUOUS MIRACLES

1. Car Speeds Off
2. Changes Direction
3. Stops and Door Opens
4. Driver Comes Out
5. Car Hood Goes Up
6. Inspection-Time Over Hood Closes
7. Driver Goes In Again, Door Closes
8. Car Speeds Off Again

Imagine Only **$2.98** complete

Here is the action-packed MIRACLE CAR to thrill and amaze you for hours. Imagine! A car door which opens itself, a driver who comes out automatically, a hood which goes up "for inspection", an auto which starts, turns and stops by itself. This astounding all-automatic action is made possible by an all-metal powerful clockwork mechanism. NEVER A DULL MOMENT with door and hood opening and closing, a driver who goes into action. No wonder MIRACLE CAR is acclaimed as an amazing toy car! SEND NO MONEY! Remit with order and we pay postage or C.O.D. plus postage.

NOVELTY MART 59 East 8th Street, Dept. 108 New York 3, N.Y



AAF TYPE SUNGLASSES

REGULAR VALUE $10.00 - NOW

4 Base optically ground lenses, gold plated, adjustable frames. Order now by mail. Shipped postpaid except C.O.D. with a **Lifetime GUARANTEE.** Return the sun glasses at any time and we will repair them for 50 cents.

$1.99 WITH CASE

BEN'S SURPLUS *Write for FREE Army Surplus List*
138 Michigan Street, N.W., Grand Rapids 2, Mich.

JUMBO Heavy Duty DEALERS WANTED

Cuts Nails Without Injury

15⅝" OPEN
14 Ozs.

Handy around
- ORCHARDS
- SHOPS
- SHIPPING ROOMS

Great for HUNTERS, TRAPPERS, SCOUTS, CAMPERS, etc.

Check or M.O. | Gun Metal $2.95 | Chrome Plated $3.95

JUMBO JACK KNIFE CO.
2452 W. 28th ST., GRAND RAPIDS, MICH.

RUPTURE

RELIEF...OR YOUR MONEY BACK

Web Truss...improved design for natural relief at a reasonable price. Reputable surgical manufacturer, years in business, offers folder if you write now. Money Back Absolutely Guaranteed If Relief Not Satisfactory.

WEB TRUSS CO. Dept. S-52 Hagerstown, Md.

Guaranteed by mfgr. for FULL YEAR

Handsome Swiss wrist watch...

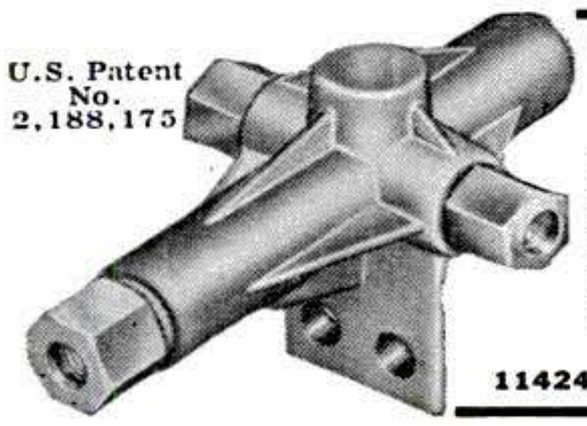
Marvelous value in a good-looking watch, built by skilled Swiss craftsmen. So well-made that a printed **one-year guarantee** is given. Has sweep second hand, glow-at-night dial, rugged chrome case, unbreakable crystal. Timed and tested movement; leather strap.

Send no money—10 day trial

Pay postman $6.95, plus tax and postage (or send check and we pay postage). Return in 10 days, if not delighted.

ONLY $6.95 plus 69c tax

Swiss Watch Distr.
Dept. 905-B
SANDY SPRINGS, GA.



U.S. Patent No. 2,188,175

VAPOR INJECTION *gives* SUPER POWER

VAPOJET gives your car super aircraft power and performance. This amazing NEW injector gives 25% more gas mileage on regular gas. A double saving! Eliminates carbon, vaporlock and overheating. COMPLETE ready for easy 30-minute installation. Fits all cars. *Satisfaction guaranteed.* Order today! $9.75—$1 with order or send M.O. or check—and save postage. Give No. of cylinders.

VAPOJET MFG. CO.
11424-C Biona dr. Los Angeles 34, Calif.

ORDER TODAY

Gentlemen: Please rush me.....Vapojet units, complete with necessary linkage, instructions, etc. Enclosed is my check (or money order) in amount of $.....

Car.....No. of cyl.....Year.....

NAME.....

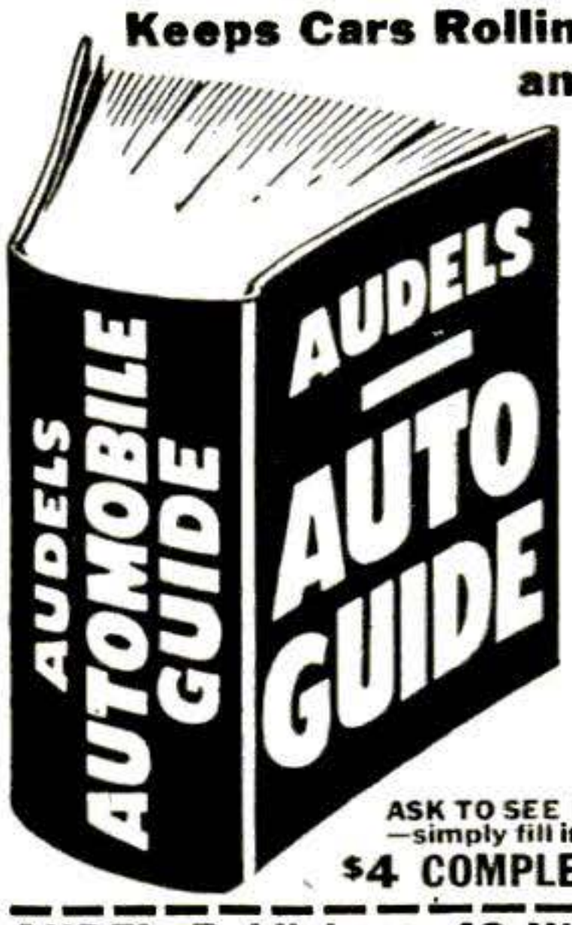
STREET.....

CITY.....STATE.....

Copyrighted material

PRACTICAL AUTO INFORMATION

Keeps Cars Rolling by Making Repairs and Adjustments Easy!



AUDELS AUTO GUIDE
For Every Mechanic, Driver, Owner and Repair Shop.

Sent on 7 Days Approval
Shows How to Tune Up—Keep Brakes Safe—Batteries Powerful—Tire Mileage Up—Save Gas—Lubricate Correctly.

ANSWERS YOUR QUESTIONS
Contains all you need to know about 1—Construction, 2—Operation, 3—Service, 4—Repair of Modern Motor Cars, Trucks, Buses & Diesel Engines in every detail.

NEW FLUID DRIVE TREATED
Easy to understand—1540 Pages, 1540 Illustrations. Gives definite directions on How to handle service jobs.

ASK TO SEE IT—Get this information for yourself—simply fill in and mail coupon today.

$4 COMPLETE • PAY ONLY $1 A MO.

AUDEL, Publishers, 49 West 23rd St., New York
Mail AUDELS AUTOMOBILE GUIDE ($4) for free examination. If O. K., I will send you $1 in 7 days; then remit $1 monthly until $4 is paid. Otherwise, I will return book promptly.

Name .....
Address .....
Occupation .....
Employed By ..... PSM

START AS HIGH AS $3,351 YEAR

Many early Examinations Expected. Prepare NOW! Veterans Get Special Preference! 40-Page Civil Service Book FREE

Mail Coupon Today SURE ★

COUPON

Franklin Institute
Dept. P-81
Rochester 4, N. Y.
(Not Gov't Controlled)

Gentlemen: Rush to me FREE of charge, list of U. S. government big pay jobs. Send FREE 40-page book describing salaries, vacations, hours, work, etc. Tell me how to qualify for one of these jobs.

Name.....
Address.....Vet?.....

BUILD YOUR OWN POWER LAWN MOWER

WHY BREAK YOUR BACK MOWING FIELD OR LAWN?

WRITE FOR FREE BUILDING INSTRUCTIONS

The Rite-Way Mower Attachment ▶ Ball Bearing

SAVE MONEY SAVE TIME

Now anyone can save time and effort mowing field or lawn by building their own whirl type power mower. Build according to your own ideas and needs at small cost. Cut close to fences, walks, buildings, etc. Build in short time with parts and instructions we furnish. Save hours of time and back breaking labor. Write today for FREE information.

IT'S FUN TO BUILD

T & H MFG. CO., Dept. M-127
811 E. 31, Kan. City 3, Mo.

NEW 1949 Plastics Supplies Catalog

Just off press. Full details on Plexiglas, Lucite, rods, sheets, tubes. Acetates, cements, dyes, buffs, molding sets, tools, carving kits, accessories. Everything in plastics. Gives prices, sizes, colors, etc. Price 10c, stamps or coin, with ad for catalog.

PLASTICS MFG. & SUPPLY CORP.
Dept. PS-5 4707 Euclid Ave. Cleveland 3, Ohio

$ $ USE TOILET PAPER $ $

In Your Car Filter. Save 94% On Cartridge Changes. GUARANTEED E-Z Installed Adapter Plates For Your Filter $3.50 Postpaid. Free Literature. Dealer Inquiries Invited.

R. G. ZENICK CO.
327 NO. CALIF. ST., BURBANK, CALIF.

REAL ESTATE BE A BROKER

PAYS BIG! SEND FOR FREE, BIG, ILLUSTRATED CATALOG NOW! No obligation. Graduates report making substantial incomes Start and run **your own business quickly.** Men, women of all ages, learn easily. Course covers Sales, Property Management, Appraising, Loans, Mortgages, and related subjects. **STUDY AT HOME** or in our classrooms in big cities. Diploma awarded. G.I. approved. Nationally known.

FREE BOOK TELLS HOW

WEAVER SCHOOL OF REAL ESTATE (Est. 1936)
15 E. Pershing Road Dept. NT-1 Kansas City, Mo.

If I Send YOU THIS FINE SUIT—

Will You Wear It and Show It to Friends?
I need a reliable man in your town to get a fine, made-to-measure, all-wool suit without paying cash, but by taking a few orders from friends. Wear it—show it—to help you take **more** orders with my line of nearly 100 guaranteed quality fabrics. You can make up to $12 in a day without experience or investment. I supply everything required FREE. Write for FREE outfit. **John Grant,**
STONE-FIELD CORP., 532 S. Throop St., Dept. S-821, Chicago 7, Ill.

GENUINE DIAMONDS SAVE UP TO 50% AND MORE

Iron-Clad Money Back Guarantee

SEND FOR **FREE** Diamond Catalog

The BERMAN Co.
DIAMOND BROKERS
America's Great Diamond Values
DEPT. PS BERMAN BLDG., BALTO. 1, MD.

BERMAN'S *Illustrated Catalog* OUT OF PAWN GENUINE DIAMONDS
VALUES FROM $10 TO $10,000

Copyrighted material

WAR Surplus AND OTHER Startling BARGAINS!

BRAND NEW Khaki SUN TAN SHIRTS & PANTS

BRAND NEW! Pants made of 8 oz. and shirts of 6 oz. mercerized khaki suntan twill materials. Well tailored. Add 8c per garment postage.

SHIRTS 14 to 17 $2.65 PANTS 29 to 42 $3.44

SENSATIONAL VALUE!

Aviators' Style SUN GLASSES

Precision made. 24 K GOLD PLATED METAL FRAME. 4 base curve. Opthalmic ground. Pearl sweatband. SHUTS OUT 95% OF THE ULTRA VIOLET RAY. We sold thousands at $6.00. Add 12c postage and handling. $1.99

50 FT. HANK NYLON PARACHUTE CORD

59¢

New. 1/8 inch diameter. Ideal for clothes lines and venetian blind and drapery cords. 550 lbs. tensile strength. Add 3c postage.

O.D. wool serge SHIRTS-PANTS

Used but in excellent condition, perfect. They have been designated for RE-ISSUE BY THE GOV'T. Pure wool serge. Less than the price of the cheapest overall. Add 8c per garment for postage.

SHIRTS 13 to 15 2.59 PANTS 27 to 33 2.79

NAVY STYLE T-SHIRTS

Brand new. Sizes, small, medium and large. White only. Fine long staple combed cotton yarn. Add 3c per garment postage.

55¢

50% Wool SOCKS

Men's med. lightweight. Khaki and natural colors. Excellent value. Add 2c post. per garment.

39c 10 PR. $3.80

Surplus DUST MASKS

33¢

Brand new. For paint or insect spraying. For millers and farmers. Perfect dust protection. Add 5c postage.

Greatest Watch Value in U.S.A! 17-JEWEL Military Style

Think of it! Here is a genuine 17-jewel wrist watch with a GUARANTEED SWISS MOVEMENT. WATER & DUST REPELLANT, SHOCKPROOF, ANTI-MAGNETIC, RADIUM DIAL and SWEEP SECOND HAND. Set in a genuine stainless steel case with a fine leather strap. Save at least $15.00. If you don't think this the greatest value in the U.S., return it for refund.

19.95 PLUS 10% FED. TAX

SEND FOR FREE

U.S. NAVY WORK JACKETS

Made of 8 oz. green herringbone twill. Tailored to Navy specifications. Ideal utility and work jackets. Add 10c per garment postage.

1.69

WAR Surplus CIRCULAR

OVER 150 OUTSTANDING WAR SURPLUS BARGAINS ---also many other special offers.

ARMY STYLE COMBAT BOOTS

6.88

NEW. For sportsmen and outdoor wear. 10" high. Reversed uppers, full oak leather sole, with composition outer sole. Add 27c post.

6 TO 12

NAVY STYLE FIELD SHOES

4.99

Rugged and comfortable. Reversed uppers. Full oak leather sole, composition outer sole. Sizes 6 to 12, E & EE. Add 22c post.

6 TO 12

OFFICER STYLE OXFORDS

6.95

Best quality uppers. Goodyear welt. Top grade oak leather sole. Sizes 6 to 12, D & E. Add 20c post.

•BROWN •BLACK

O. D. WOOL MUMMY TYPE SLEEPING BAGS

Ideal as a sleeping bag or as an added liner for a sleeping bag. 100% O. D. wool. Add 18c post.

$3.88

Surplus NAVY UNLINED FIELD JACKETS

BRAND NEW. Made of fine quality water-repellant poplin material. Unlined, full zipper front, 2 slash pockets. WORTH TWICE OUR PRICE. Add 10c postage.

NOW ONLY 2.99

DOWN and FEATHER FILLED MUMMY TYPE SLEEPING BAGS

BRAND NEW. Water repellent poplin outside. Complete with carrying bag. Down and chicken feather filled. Full size. Add 35c post. 13.99

WOOL LINED KHAKI PANTS . . $2.88

Used, perfect. Regular $12.00 value. Khaki (chino) outside, all wool kersey lining. Sizes 28 to 34. Add 15c post.

63% WOOL CUSHION FOOT SOX

Ideal for outdoor wear, gym sox, etc. Khaki and white. Exceptional value. Add 3c post.

49c 10 PR. $4.80

ORDER BY MAIL

Please send remittance with order. Add postage. Absolute satisfaction or your money back.

Send today

SIOUX FALLS SURPLUS STORE SIOUX FALLS, S. D.

Learn SHOE REPAIRING

ALSO COURSES IN HAT CLEANING AND BLOCKING

PRACTICAL SHOP TRAINING

• Excellent opportunities for good jobs or a successful business of your own. Prepare quickly—practical shop work and shop management taught by experts. Here is a field for a man who wants to be his own boss. Approved for Veterans. Help in finding part time work while a student, employment service to graduates. Write today for FREE information.

CHICAGO SCHOOL OF SHOE REBUILDING
124 E. 26th St. Dept. PS-4 Chicago 16, Illinois

STAMMER?

This new 128-page book, "Stammering, Its Cause and Correction," describes the Bogue Unit Method for scientific correction of stammering and stuttering—successful for 48 years. *Free—no obligation.*

GET THIS FREE BOOK!

BENJAMIN N. BOGUE, Dept. 4915
Circle Tower Indianapolis 4, Ind.

WOULD YOU SPEND 10¢ TO LEARN DAN LURIE'S MUSCLE BUILDING SECRETS?

DAN LURIE four time winner "AMERICA'S MOST MUSCULAR MAN" shows all the finest, lowest priced body-building equipment in one complete, sixteen page catalog of BARBELLS and health equipment.

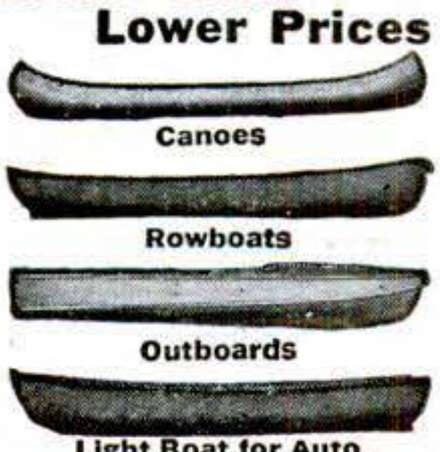
This is the same guaranteed method that champions throughout the world use. Dan Lurie says, "Either I show you, without the bunk and baloney, how to turn your flesh into power-packed muscles or back goes your dime. You can't afford to wait. Write today!

Send for the big, three color catalog mentioned above now! Only 10 cents . . . no stamps please. POSTAGE FREE

DAN LURIE BARBELL COMPANY
Dept. 170E, 1729-S. Rockaway Parkway
BROOKLYN 12 NEW YORK

Thompson BEATS the World on BOATS

Better Built Lower Prices



Safe Boats With Full Length Spray Rails

Keep passengers perfectly dry—even at high speeds. Catalog also shows two new models of "Take-Along" Boats. Two big factories—save you freight.

CATALOG FREE
Write for your copy. State kind of boat in which you are interested.

THOMPSON BROS. BOAT MFG. CO. (151)
219 Ann St. PESHTIGO, WIS. (Write to either place) 119 Elm St. CORTLAND, N.Y.

Profit and Fun CARVING LEATHER at home spare time full time

New Device makes it possible for beginners to ***improve overnight.*** Now is the time to cash in on this Big Paying business — year round profits are easy if you follow ***new method*** of instruction to be found ***only*** in Baird's home study course. Big sale for bill folds, wallets, belts, purses, gun holsters, saddles, and other leather articles. Make up to $50.00 per week spare time or up to $500.00 or more monthly full time.

Start your own business. Make Xmas presents and other gifts. The Baird Course is ***Complete.*** Full instructions — Tools and equipment — including new device that makes learning easy.

Write for full details and interesting catalog — containing many profitable suggestions — ***Sent Free — Write Now.***

DEPT. PS-5

BAIRD SCHOOL OF LEATHER CARVING • 221 Manitou Ave., Manitou Springs, Colorado

Copyrighted material

INVENTORS

When you are satisfied that you have invented a matter of value—write me, without obligation, for full information as to what steps you should take to secure a Patent.

The usual first step is to have a search of the prior U. S. Patents conducted, so that I can report to you on the question of Patentability.

PATRICK D. BEAVERS
(Formerly RANDOLPH & BEAVERS)
Registered Patent Attorney
937 Columbian Building, Washington 1, D. C.

PATRICK D. BEAVERS, *Registered Patent Atty.*
937 Columbian Bldg., Washington 1, D. C.
Please send me full information on how to secure Patents & Trademark Registration.

Name.....

Street.....

City.....*State*.....

An Invitation To
INVENTORS

Here is the rare opportunity for inventors. The primary purpose of this Exposition is to aid inventors in the promotion of their ideas to both the public and industrial leaders.

First International Inventors Exposition

Sponsored by the American Inventors Association

GRAND CENTRAL PALACE
NEW YORK CITY
JUNE 4-11, 1949

The International Inventors Exposition is open to *any* inventor with an invention that has merit in the opinion of the Exposition Committee.

Private inventors can exhibit at the Exposition on equal footing with commercial entrants because the American Inventors Association arranged for them to join the Association and present exhibits at a greatly reduced fee.

Please send photograph of your invention with complete description thereof, and also photograph of yourself, to the Exhibition Committee, **International Inventors Exposition, 525 Lexington Avenue, New York 17, New York.** If your invention meets the requirements of the Committee, application for inclusion in the Exposition and complete details will be sent to you promptly.

Bar Bells

Buy Direct From Factory
Write for free booklet and price list
$8.95 up
INDEPENDENT IRON WORKS
2416 East 23rd Street, Dept. D
Los Angeles 11, Calif.

INVENTORS

Whether an invention is patentable can be substantially determined by a search of the U. S. Patent records. Without obligation, write for information explaining the steps you should take to secure a patent.

JOHN N. RANDOLPH
Registered Patent Attorney
205 Columbian Building Washington 1, D. C.

PATENTS AND INVENTIONS FINANCED, MARKETED AND PUBLICIZED
Irwin F. Mills Associates
Business Consultants
Public Relations Counsellors
SEND FULL DETAILS FOR QUICK ACTION!
19 W. 44 St. New York 18, N. Y.

PATENTS PATENT LAWYER

TRADE MARKS
GUSTAVE MILLER
59PS WARNER BLDG.
WASHINGTON 4, D. C.

ASSOCIATE EXAMINER
U. S. PATENT OFFICE 1922-1929
REGISTERED PATENT ATTORNEY
Send for Form
"INVENTOR'S RECORD"

HELP FOR INVENTORS

Hundreds of manufacturers have requested our assistance in locating marketable new products.
Complete information, free.

INSTITUTE of AMERICAN INVENTORS
Dept. 3, 1926 Eye St. N.W., Washington 6, D. C.

PATENTS
AND TRADE MARKS
C. A. SNOW & CO.
REGISTERED PATENT ATTORNEYS
WRITE FOR INFORMATION TO
246 SNOW BUILDING, WASHINGTON 1, D. C.

INVENTORS

IF YOU WISH TO PROTECT YOUR INVENTION,
You should take steps to protect it by a U. S. Patent. Write me for "Record of Invention" form.

CARL MILLER
REGISTERED PATENT ATTORNEY

Woolworth Bldg., 35th Floor. Dept. 59-C, New York City
Please send me "Record of Invention" form.

NAME.....

ADDRESS

Copyrighted material

WHICH OF THESE *Opportunities* INTERESTS *You* MOST?

•*Today,* choose the job you want—and prepare for it. Or if you are already engaged in the work you like best, start training *now* for quicker promotion. Acquire the knowledge that will help you to get ahead faster, make more money and have greater security.

American School, founded in 1897 as an educational institution *not for profit,* can help you to reach your goal just as it has helped others during the past fifty-two years. Check the coupon at right, add your name and address and mail it at once. The school will send you details on its training plan and outline of study prepared by specialists. There is no charge, no obligation, so send the coupon immediately.

AMERICAN SCHOOL

Dept. G546 Drexel at 58th Street, Chicago 37

CHECK, CLIP AND MAIL COUPON NOW

AMERICAN SCHOOL, Dept. G546 Drexel at 58th, Chicago 37, Ill.
Without obligation, Please send FREE and postpaid, bulletin and details of the Subjects checked:

- ☐ PLASTICS ENG'R
- ☐ Refrigeration
- ☐ Architecture and Building
- ☐ Contracting
- ☐ Practical Plumbing
- ☐ Automotive Engr.
- ☐ Aviation Drafting
- ☐ Aviation
- ☐ Business Management
- ☐ Accounting
- ☐ Electrical Engr.
- ☐ Electricity-Pract.
- ☐ Electronics, Industrial
- ☐ Bookkeeping
- ☐ Private Secretary
- ☐ Diesel Engineering
- ☐ Sheet Metal Pattern Drafting
- ☐ Railway Training
- ☐ Drafting and Design for Men and Women
- ☐ Radio
- ☐ High School
- ☐ Air Conditioning
- ☐ Mechanical Eng.
- ☐ Shop Management
- ☐ Tool Making
- ☐ Better Foremanship
- ☐ Machine Shop Operations

Name.....*Occupation*.....
Address.....*Age*.....
City.....*State*.....

Treasure and Mineral
LOCATORS
GEIGER-COUNTERS
FOR URANIUM-ORES
CREDIT PLAN—FREE LITERATURE
FISHER RESEARCH LABORATORY Inc.,
Palo Alto, Calif.

LEARN DIE and TOOL DESIGNING IN DETROIT or by Mail

VETERAN APPROVED
Write for Details
ACME SCHOOL
OF TOOL AND DIE DESIGN ENGINEERING
17 Brady St., Detroit 1, Mich.

THE WORLD'S* LARGEST *WATCHMAKING SCHOOL GIVES YOU:

• G.I. APPROVED, NATIONALLY ACCREDITED COURSES • MOST ABUNDANT WORKING AND TRAINING FACILITIES • INDIVIDUAL INSTRUCTION BY EXPERIENCED FACULTY • FREE PLACEMENT SERVICE FOR PART-TIME WORK AND HOUSING DURING TRAINING • FREE EMPLOYMENT SERVICE UPON GRADUATION • COMPLETE SET OF WATCHMAKER'S TOOLS TO VETERANS • $100 BONDED GUARANTEE OF PROFICIENCY TO PROSPECTIVE EMPLOYERS.

Send For Free 116-Page Information Packet

WESTERN PENNSYLVANIA HOROLOGICAL INSTITUTE, INC.
Write Desk 39, 808 Ridge Avenue Pittsburgh 12, Pa.

New Method... **BIG PROFITS!** *Can be Yours... Right in Your Own Home*

You too can make these beautiful copper pictures and plaques right in your own living room.

No Experience Needed

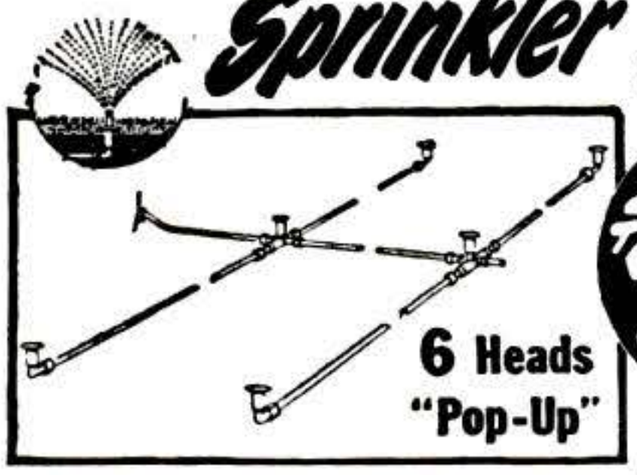
At last a way to get in on the Big Money made every day in Copper Art—Plaques—Bowls—Trays—Gifts—Souvenirs of all kinds. *No art talent necessary*—our NEW METHOD makes it so easy, even a child can do it. Big Markets waiting. Anyone can learn quickly—you start making money right from the start. Don't miss this opportunity to cash in at once on this big-paying easy to operate business. Be your own boss. SEND NO MONEY—act NOW to get all the *free* details—just send your name on a penny postcard today—Do it *Now!* Write today—

No Selling
Money-Back
Guarantee

HOLLYWOOD COPPER ART STUDIOS DEPT. PS-5 4257-A Beverly Blvd. Los Angeles 4, Calif.

Copyrighted material

EVERSPRAY UNDERGROUND Sprinkler System



ONLY $49.50 COMPLETE NO EXTRAS TO BUY!

WATERS 1000 SQ. FEET

INSTALL IT YOURSELF *IN ONE EVENING*

without Damage to Lawn!

All EVERSPRAY tubing is solid **Copper**—all fittings solid **Brass**, *machined* for perfect fit. Fingertip adjustment of spray from mist to heavy rain. No special tools needed. No pipe, pipe cutting or threading. No plumbers to pay. Simple Diagram makes connecting easy with small wrench. No upkeep. No repairs. No fear of freezing as entire system drains itself AFTER EVERY USE. Can't rust or rot—it's in for life. Yet a "renter" can take EVERSPRAY anywhere with him if he moves.

USER-AGENTS
Get Money Back

Everybody wants the EVERSPRAY when they see yours. Just send us their orders on our USER-AGENT Plan and quickly get back the cost of your own EVERSPRAY.

SALESMEN

Make tremendous profits between now and August. Write or Telegraph for complete facts, *Jack-Pot* Pyramid Sales Plan, Demonstrator offer—all FREE. Hurry!

ORDER DIRECT FROM FACTORY

under money-back guarantee. (References Dun & Bradstreet or Your Bank.) Send name and remittance of $49.50 for complete EVERSPRAY System . . . No extras to buy. Or send name on penny postcard for a beautiful folder that shows pictures and description of EVERSPRAY. It's FREE. RUSH name today.

EVERHOT PRODUCTS CO., *Everspray Division*
2001 Carroll Ave., Dept. 75, Chicago 12, Illinois

FREE BOOK tells how to build a house and SAVE up to $3000.00

Or Go into the Building Business

We show you how to build your own home at savings of thousands of dollars; or how to go into business as a Building Contractor; or get a good job in the building industry.

Get Plans for Modern House

To see about your **personal** opportunity in building, send at once for big FREE 22-page book that tells about the famous C.T.I. 47 Lesson home-study Course in Home-Building METHODS. Included with Course are Plans and Specifications for modern six-room house. Two stories, full basement, built-in garage. Plans and "Specs" alone worth far more than low cost of complete Home-Building Course. Hundreds using our methods with great success. Now find out how you, too, can build a home or be a success in the Home-Building Business. The coupon brings GOOD NEWS. Mail today.

COMMERCIAL TRADES INSTITUTE — **Approved under G.I. Bill**
Dept. D1-5, 1400 Greenleaf Ave.
Chicago 26, Ill.

Send me information on the course I have checked below:

- ☐ Home Building
- ☐ Diesel Mechanics
- ☐ Auto Mechanics
- ☐ Body & Fender Rebuilding
- ☐ Electricity
- ☐ Radio & Television
- ☐ Refrigeration & Air Cond.
- ☐ Drafting

Name.....

Address.....Zone.....

City.....State.....

( ) Vet ( ) Non-Vet

ELECTRO BAND SAW BRAZER

For Resistance Brazing of Band Saw Blades

Repairs broken saw blades without delay. Permits savings by making new blades from coil stock. Simplifies inside sawing. Welds up to ½" blade in one operation and up to 1" blade in two operations. Portable. Uses 50C-60C, 110V. Fully guaranteed.

ONLY $19.75 COMPLETE WITH SERVICE KIT OF FLUX AND SOLDER

See your dealer or write

The ERWOOD Company
CRYSTAL LAKE, ILLINOIS

Dept. BB

USED BUT REBUILT IN CLEAN, GOOD CONDITION!

ARMY SHOES $2.69 A PAIR

Now you can wear these sturdy, all weather, Army Shoes. Will last and stand up under the toughest wear. Fits comfortably, thick soled, strong leather. Russet tan color only. All sizes. Valued about $5 a pair. Now only $2.69 a pair. Also higher top Combat Boots only $3.75. Special: Both Army Shoes and Combat Boots $5.98. Send shoe size and width, name and address. SEND NO MONEY! Pay postman on delivery price plus postage. Money back Guaranteed. Order Now! Also send for our free catalog of shoes, hats, suits, army clothes, etc.

EUNICE MAIL ORDER HOUSE
Station B, P. O. Box 101, Dept. PS-E, N. Y. C.

SAVES YOU MANY DOLLARS ON ELECTRONICS, TV, RADIO & TOOLS

A penny postcard will bring you the 1949 Lafayette-Concord catalog, pages and pages of the finest equipment at amazing low prices. Use it to order everything you need, and pocket the difference. It's FREE!

Write to LAFAYETTE-CONCORD, Dept. KE-9

100 Sixth Ave. New York 13 — 901 W. Jackson Blvd. Chicago 7 — 265 Peachtree St. Atlanta 3

BARBELLS

95 lb. SET $10.80
Extra plates 10c lb.

Save Money—Buy the finest barbell equipment direct from our foundry—No other company can match our low price or value!

Send to-day for our FREE Barbell Catalog

BUR BARBELL CO.
Lyndhurst 5, New Jersey

MAKE MONEY IN LANDSCAPING

Thorough training by Internationally known Landscape Architect to start your own business, improve your home or advance in this well paid field. Many Opportunities. Approved for Veterans. Send for FREE BOOK.

NATIONAL LANDSCAPE INSTITUTE
310 So. Robertson — Dept. PS-5 — Los Angeles 36, Calif.

MODERNIZE YOUR KITCHEN

SAVE ⅔ THE COST!

New, illustrated manual shows every step in easy-to-understand charts and directions. How to modernize for yourself and get "professional" results at ⅓ the cost. Includes free design for your kitchen, plus net factory costs on knock-down cabinet fronts and other items. Have fun modernizing your own kitchen and save ⅔. Mail $1.00 for complete kit to—

THOMBERT CO.
Newton 3, Iowa

Copyrighted material

Command Bigger Money!
STUDY LAW

STUDY AT HOME for BUSINESS SUCCESS and LARGER PERSONAL EARNINGS. 40 years expert instruction—over 114,000 students enrolled. LL.B Degree awarded. All text material furnished. Easy payment plan. Send now for FREE BOOK—"Law and Executive Guidance." It explains the course—how you may enroll and the many ways you may profit from Law Study. Write TODAY to:

AMERICAN EXTENSION SCHOOL OF LAW
Dept. 14-PS, 646 N. Michigan Ave., Chicago 11, Ill.

OWN a Business

Clean and Mothproof rugs and upholstery "in the home." Patented equipment. No shop needed. Duraclean dealer's gross profits up to $20 a day on EACH serviceman. These Nationally Advertised services create repeat customers. Easy to learn. Quickly established. Easy terms. Send today for Free Booklet—Full details.

DURACLEAN CO., 18-5 PL., DEERFIELD, ILL.

INSTANT NICKEL
NO CURRENT OR BATTERIES USED

COMPLETE $2.50 POST PAID
1948 PATENT
AGENTS WANTED

Just Patented—Now everybody can **nickel plate.** No equipment, electricity or copper plating needed. Just rub. A **blessing** to Doctors, Hobbyists, Auto, Machinery and Home Owners and practically everybody. **No poisonous cyanides or quicksilver.** It will plate to a practical thickness, Steel, Iron, Copper, Brass, etc. It's **new, different, practical, economical**—By following easy directions a matte or brilliant **"chromium like"** finish is obtainable—fascinating hobby—plate for neighbors and friends. **Money-back guarantee.** C.O.D.'s few cents extra.

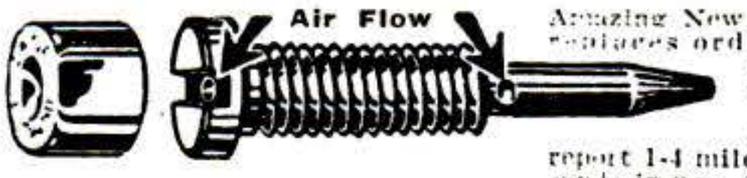
INSTANT PLATING PRODUCTS, Dept. S-5 3439 So. Michigan Chicago 16, Ill.

Learn MASONRY CARPENTRY

Big money in the building trades. Learn now while opportunities are greatest. Train in our completely equipped shops under expert instructors, or by Home Study. Vets attending school entitled to G.I. Benefits.

MIDWEST SCHOOL OF BUILDING TRADES, Dept. PS-5
411 N. Center St., Bloomington, Ill. 2622 N. 16th St., Omaha, Nebr.

SAVE GAS • get 1 to 4 EXTRA miles per gal.



Amazing New GANE Air-Flow needle replaces ordinary idle adjustment screw in your carburetor. SAVES GAS. Faster pickup, Easier starting, perfect idling. Owners report 1-4 miles more per gallon. Thousands in use. *10-Day Money-Back guarantee.* Quickly installed on cars & trucks. *Order yours Today!* Complete with instructions. $1.50 ea.

State make, model and year. Also kind of carburetor. 6 cyl. cars use one. 8 cyl. cars use two.

Cameron Mfg. Co. 539 E. ADAMS ST. DEPT. PS-549 PHOENIX, ARIZONA

MACHINE SHOP EQUIPMENT

• The 1949 edition of the famous Center Tool Co. Catalog is now ready! Every workshop owner should have a copy. 240 pages full of illustrations, descriptions, and prices of the latest tools made by best known manufacturers in U.S. You pay the cost of printing —50c. ***We refund your 50c with your first order of $10.00 or more.*** Prompt delivery on most tools. Send check or money order today!

CENTER TOOL CO., 153 Centre Street, Dept. D, New York 13

WAR SURPLUS AND OTHER BARGAINS

Aero-Torch

THE OUTSTANDING OFFER OF THE YEAR FOR MECHANICS OR HOBBYISTS!

for HEATING BURNING SOLDERING or BRAZING

A compact versatile torch for electricians, plumbers, painters, auto mechanics, dental technicians, jewelers, neon glass formers, plastic workers and radio repair men. Burns propane or butane for 13 continuous hours at cost of only 3c. No moving parts to get out of order. Burns in any position with non-varying flame at approx. temp. of 3660°. No hose connections to get in way. Always ready for use! Built to withstand 2800 lbs. p.s.i. 2¼" diameter, 10½" long. Complete wgt., only 2 lbs! **AN AMAZING VALUE . . .** *Only* **$13.95** each

---

MICROMETERS

Chrome plated, precision engineered and carefully tooled to give long life. All new. 0-1" capacity . . . . ea. **$2.25.** 1-2" cap. **$3.50.** 2-3" cap. **$5.50.** 3-4" cap. **$6.50.**

HAND MITRE
"It pays its way in just one day!"

IT'S SENSATIONAL!

New HAND MITRE saves the carpenter - picture framer - cabinet maker and craftsman hundreds of hours . . . a "flick" of the hand and a few seconds for a precision mitre every time.

The HAND MITRE will cut any desired angle. Its rugged construction will handle hard and soft wood mouldings, plastic trim, base shoe, dowels, laminated materials, rubber extrusions, leather, linoleums and asphalt tile.

Made of heavy gauge stainless steel, electro polish finish. Will endure years of hard usage.

Eliminate bulky mitring equipment - save valuable hours and labor. . . . . **$3.95** postpaid.

U. S. NAVY RUNNING LIGHTS

Many uses including on patios, homes, entrance ways, driveways, game rooms, boats, for guide and walk-around lights, etc. Multiple bulbs assure continuous burning. Vibration-proof screw-down top. Solid brass lamp base. Cadmium-plated, cast steel detachable mounting bracket included, or may be hung from steel hook. Solid brass, heavy-duty quick-change plug assures instant switch on or off. Weather proof! Available in red, blue or white. Burns intermediate type, screw base lamps on 12-24-32-110-115 or 220 Volt A.C. current simply by changing bulbs. Weight 12 lbs. Govt. cost about $50. . . . Price less bulbs, **$6.95** each.

CAMPERS' SPECIAL

Fancy briar pipes from Quarter Master Corps. Assorted shapes and sizes. All popular makes. Set of 7 . . . **$3.50**

HIGH SPEED DRILL BITS

ALL NEW! Original Value $15.00. 30 assorted sizes and lengths, **$3.50**

U. S. NAVY ALARM BELLS
ELECTRIC

For indoor or outside use -- on ranches, for schools, plant installations, as burglar alarm systems, signal systems, etc. Three different types: COW BELL TYPE Mfd. by Henschel (Wgt. 9½ lbs.); VIBRATING TYPE -- high pitch - (Wgt. 8½ lbs.), and VIBRATING TYPE B4 -- medium tone -- (Wgt. 8 lbs.) both Mfd. by Edwards. All new in original packages! Heavy duty brass clapper with solid brass gong. Safety lock-nut secures gong permanently. Will work on 115 Volt A.C. lines. Govt. cost about $65.00 each. Complete with mounting plate. Your choice, any type, each **$12.50.**

Gong Diameter 8½"

COOLER, BLOWER OR HEATER: Can also be used in trailers, offices, darkrooms, homes or may be used as dryer. **DUMORE** Motor 1/6 cont. H.P., Amperage 7.5, RPM 6400, 24 V. Radiator type circulation, copper coils. Very efficient for car or truck when connected to battery. Simple installation. Wgt. 13 lbs. . . . New! **$15.00.**

TRANSFORMERS

Automatic Winding Company Transformer. 60 cycles A.C. Input, 75-125 Volts. 4-step output, 5-6.3 Volts. Single winding. For radio, radar, television, chimes, and all low voltage gadgets. Weight 5 lbs. . . . . New! Each **$3.50**

Stolle Engineering Co. Transformer. Primary Input, 115 Volts. 60 Cycles. Flexible color-coated leads. Output, 6-12-24 Volts. Will work aircraft gadgets, heater relays, signal systems, radio test filaments, home chimes, etc. off house current. A good item for the home gadgeteer. Weight 7 lbs. . . . . New! Each **$7.95**

Jefferson Electric step-up or step-down transformer. Input, primary 110-117 Volts A.C. Output, from 5 Volts to 650 Volts. Suitable for use with war surplus gadgets, heater relays, radio test filaments, electric trains, house chimes, etc. Wgt. 10 lbs. . . . New! Each **$7.95**

SEND FOR FREE DESCRIPTIVE CATALOG

Send check, money order or cash. 25% deposit required on C.O.D. orders. All prices F.O.B. Culver City, Calif. unless otherwise indicated.

AIRBORNE SALES CO., INC. DEPT. PSM 5-9 CULVER CITY, CALIF.

Copyrighted material

Low FACTORY-TO-YOU Prices

New! MIDWEST TELEVISION

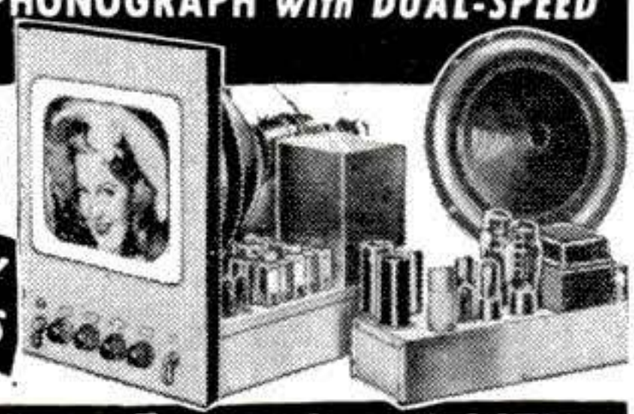
with BIG 75 Square Inch SCREEN

Offering

- 12½" PICTURE TUBE
- 12 TELEVISION CHANNELS
- PICTURE-HOLD CONTROL

Other Models Include: SYMPHONY GRAND AM-FM RADIO-TELEVISION-PHONOGRAPH *with DUAL-SPEED* RECORD PLAYER

. . . also complete CHASSIS for Custom Installation—and Adapter Chassis and Consolette for use with 1947, 1948, 1949 Midwest Radio Models.



30 DAY TRIAL EASY TERMS

Also– Sensational NEW

MIDWEST RADIOS

with

DUAL-SPEED Phonograph

Send for TELEVISION Folder Prices and NEW 1949 MIDWEST RADIO Catalog

MIDWEST RADIO & TELEVISION CORP.
Dept.T-2410,909Broadway,Cincinnati,O.

Name_____

Address_____

City_____ Zone___ State____

FREE BOOK

TELLS HOW TO BE AN . . .

Accountant
Salesman
Secretary
Stenographer

SECURED FUTURE . . .
FREE EMPLOYMENT SERVICE

Enter one of the "substantial earnings" fields through Hill's "Success Plan" training. A lifetime opportunity to join thousands of successful graduates in positions secured through our nation-wide employment service. No matter where you live, what you are doing now, Hill's can train you by study at home or in the resident school. Big Free book shows you the way to substantial earnings and an assured future. G. I. Approved.

MAIL THIS EASY-TO-USE COUPON TODAY

Hill's Extension School & Business University
Dept. PS-59, 619 W. Main St., Oklahoma City 2, Okla.
Please send your free book, "Through Hill's to Success."

NAME.....

ADDRESS.....

CITY.....STATE.....

☐ Check here if eligible under G.I. Bill.
Please check course and training plan preferred.
Course..... ☐ Resident ☐ Home Study

Famous BANNER FIREWORKS!

ZIP! BOOM! BANG! OH-BOY!

You can always depend on BANNER FIREWORKS to give you the most for your money. This year we offer you a greater value than ever before.

OVER 1000 PIECES
$13.25 VALUE—ONLY $4.95

All your old favorites plus several startling new items. Buzz Bombs, Star Shells, Block Busters, Siren Aerial Bombs, Zig Zag Whistles, Flashlight Krackers, Jap Pop-Bottle Sky Rockets, Cherry Bombs and hundreds of others. Plenty for a complete day and night celebration. But don't delay. Get your order in now while stocks are complete. No C.O.D's. Send certified check, Money Order or Bank Draft. Register the letter if you send cash.

BIG NEW CATALOG FREE.

BANNER FIREWORKS MFG. CO. INC. DEPT. 187
446 Capistrano Toledo 12, Ohio

"YOU ARE UNDER ARREST!"

Help Bring Crooks to Justice Through Scientific

CRIME DETECTION!

We have taught thousands this exciting, profitable, pleasant profession. Let us teach you **in your own home.** Learn Finger Printing, Firearms Identification, Police Photography, Secret Service Methods thoroughly, quickly, at small cost. Over 800 of all American Bureaus of Identification employ I. A. S. students or graduates. We can prepare you for this fascinating work during spare time. Write today, **stating age,** for "Blue Book of Crime."

INSTITUTE OF APPLIED SCIENCE, 1920 Sunnyside Ave., Dept. 1365, Chicago 40, Ill

---

$4.95

REAL ENGINE VALUE

A miniature gas engine that really operates. Thousands of Buzz "B" gasoline engines have been sold at twice the price. Now is your chance to buy a real 1/6th H.P. gas engine for only $4.95. Turns up over 8,000 rpm. For Boats, planes, midget cars, etc. Guaranteed and ready to run. Includes Champion spark plug and tank. Send only $1.00, engine shipped collect for balance, same day. Write for free catalog or **SEND 10c FOR NEW MAMMOTH ILLUSTRATED CATALOG OF THOUSANDS OF HOBBY ITEMS.**

America's Hobby Center, Inc., Dept. S-59, 156 West 22 St., N. Y. 11

Win WITH VOODOO CARDS

Secret code on back of this special deck of playing cards reveals to YOU what each card is when lying face down. Simple instructions for using code in performing "magic" tricks sent with each deck, only $1.49. This deck can be used for poker, bridge, black-jack, etc. FREE - One Deck With Order For Three Decks! SEND NO MONEY! Send name and address. Pay Postman plus postage.

WEST CO., D 32, Box 2163, RICHMOND, VA.

Earn GOOD MONEY QUICKLY
Learn AUTO FENDER REPAIRING

At home, the easy way with only a few low cost hand tools. Get paid for working on cars of friends and neighbors. Nearly every fender is dented. Just follow simple step-by-step directions in "How to Repair Minor Dents". Send $3 for your copy including Free consultation service.

MASON TRADES PUBLICATIONS
4003 W. Madison St. Chicago 24, Ill.

100% PROTECTION

TEAR GAS

A REAL SURE-FIRE SELLER!

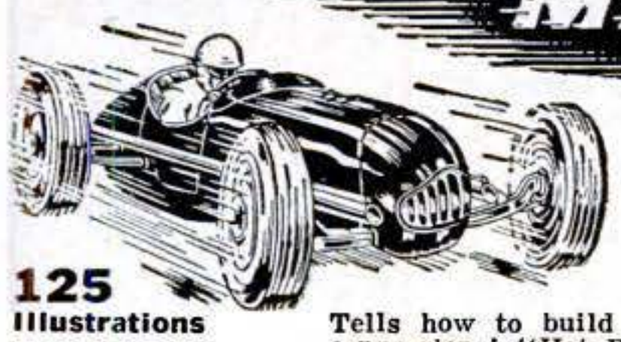
THUGS AND THIEVES BEWARE!

Here is a tear gas pencil gun which discharges smothering clouds of tear gas to instantly stop, stun and incapacitate the most vicious man or beast. A safe and effective substitute for dangerous firearms. No permanent injury. Needed in Stores, Banks, Autos and Homes, everywhere to protect Life and Property. No skill required. Handle our tear gas as a side line and you'll soon give it full time. For a quick start send $3.60 for complete demonstrator outfit consisting of an Automatic Pencil Gun with 10 demonstrators and 3 powerful Tear Gas cartridges fully guaranteed. Many thousands now in use. Order your outfit today. Not sold to minors.

Hagen Supply Corp. Dept. P-505 St. Paul 4, Minn.

Copyrighted material

SPEED-MILEAGE MANUAL



Easily Obtain Greater Speed, Mileage, Racing Performance From Any Automobile!

Famous new book shows simplified soup up methods—Speed Tuning—Mileage Secrets—Economy Tips!

125 Illustrations

Tells how to build your own speed equipment! Fast conversions! "Hot Rods!" Custom Cars! Complete instructions on building inexpensive superchargers, Hi-Speed Heads, Dual Mufflers, Manifolds, "Water Injectors!" All about engines, "Economy Tuning," Restyling, "Racing Tricks"—Fuels! Reveals Track Proven Methods that will give your car thrilling new getaway—with up to 30% more speed and mileage!

Also shows latest "Hollywood Custom Styling" methods, streamlining sport changes! Money-saving Speed Conversions! Includes California Roadster Plans! Working Drawings! Speed Catalogues! Photographs! Complete Data—PLUS "Beautiful Custom Car & Hot Rod Pictorial Supplement!"

SATISFACTION GUARANTEED—
ONLY COMPLETE BOOK OF ITS KIND . . . . Only $1.98 Postpaid
ALMQUIST ENGINEERING Milford 81, Penna.

ENORMOUS PROFITS CASTING AT HOME

Write today for NEW FREE CATALOG

Learn to cast thousands of perfect figurines, plaques, book ends, ash trays, etc. Start **NOW—NO EXPERIENCE, LITTLE CAPITAL** needed. Earn **GREAT PROFITS** with **X.L. RUBBER MOLDS.** X.L. Rubber, Pts. **$2.00;** Qts. **$3.50;** Gallons **$8.95;** Models and enough rubber for 3 molds . . . **$1.00**—plus postage.

PLASTIC ARTS STUDIO Route 2, Dept. 3 MUNCIE, IND.

NEW! SUN VISOR CARRY-ALL

Placed conveniently on the sun visor, the all-metal CARRYALL holds a cigarette pack, cleansing tissues, toll coins, maps and notes. Makes motoring a pleasure.

Get yours today! Send only $1.00. We'll pay the postage

E. B. METAL PRODUCTS CO.
227 E. 144th Street, New York 51, N. Y.

WHEELS—WHEELS

5" disc wheel, 5/8" tire, 5/16 or 3/8" sleeve $0.30
6" disc wheel, 5/8" tire, 5/16 or 3/8" sleeve $0.35
7" disc wheel, molded tire, 3/8" sleeve $0.45
8" disc wheel, 1 1/8" tire, 1/2" sleeve $0.70
7" disc wheel, 1" tire, 1/2" ball bearing $0.80
8" disc wheel, 1 1/8" tire, 1/2" ball bearing $1.00
10" disc wheel, 1.75 semi-pneumatic tire, 1/2" B.B. $1.50
Above wheels painted red
10" cast alum. wheel, 2 3/4" semi-pneumatic tire, 5/8" ball bearing $4.50
Hub caps for 5", 6", 7" wheels . . . . . 3c each Plus postage

UNITED WHEEL STAMPING CO., Dept. PS-5
2756 W. 115th St. Chicago 43, Ill.

LAWN ORNAMENT-NOVELTY PATTERNS

28 Lawn Ornament Patterns, 25c. Other patterns: 15-20" high; Dutch Girl, Dutch Boy, Pirate, Bull Terrier, Mexican Girl, Mexican Boy, Dwarf, Penguin, Flower Girl, 10c each. 25 Novelty Patterns, 30c. **All 62 Full Size Patterns, $1.00 Postpaid.**

FLYING DUCK

Wind revolves wings. Realistic appearance. Pattern, Instructions and wing Pinion Kit; brass bearing, steel shaft, wing lugs, bolts, nuts and washers. 50c. Pattern and Instructions without kit, 25c. Postpaid.

STROTHER PATTERN SERVICE
Dept. 7-AT Box 128 Belington, W. Va.

SCREWY-MIX BARGAINS

1—Assorted machine screws, sheet metal screws and bolts, sizes 2-56 to 3/8-24, various type heads. 3 LBS. $1.15—5 LBS. $1.50.
2—Mixed Steel Rivets 1/16 to 1/4 dia. Flat and Round Heads. Various lengths—five pounds $1.00.
3—Mixed Aluminum Rivets—50c LB. Mixed Wood Screws 35c LB.
4—Mixed lock and flat washers 30c LB. Mixed Nuts 50c LB.

Add 5c per LB. for parcelpost on Screwy-mix.

BEARINGS

Minimum order bearings $1.00 add 10c postage.

Bore	O.D.	Type	Price
5/32"	5/8"	Ball	15c
3/16"	1/2"	Needle	15c
1/4"	5/8"	Needle	15c
1/4"	3/4"	Ball	22c
1"	1 1/4"	Needle	28c
5/8"	1 3/8"	Ball	40c

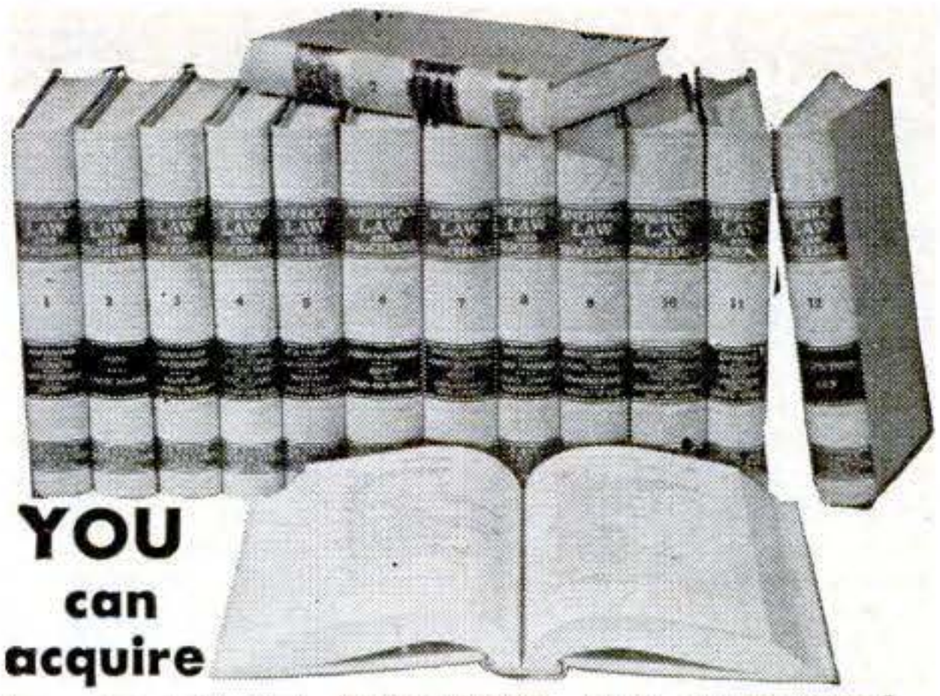
SANDING BELTS

Carborundum & Behr-Manning Minimum Order $1.00

Size	Grit	Each
4"x48 1/2"	80 & 100	45c
4"x36"	120	35c
1"x44"	100	25c

JAY-CEE SALES CO., 4554 Grand River Ave., Detroit 8, Michigan

---



YOU can acquire LAW NIGHTS AT HOME! L L.B. DEGREE

LaSalle's famous Law Library—used as reference in many Law libraries and Law offices—has enabled thousands to master Law surprisingly fast, in spare hours at home, for business and professional advancement.

These 14 remarkable volumes, compiled by leading professors and lawyers, cover the whole basic field of Law in condensed, orderly, simplified manner.

You advance rapidly with this great library, plus special lectures furnished. We guide you step-by-step with personalized Problem Method of instruction . . . you *learn by doing*—handling legal problems—not by memorizing rules.

Send for two FREE 48-page booklets, "Law Training for Leadership," and "Evidence," answering questions about Law and its value to you, and telling how LaSalle Law graduates are winning rapid advancement in business and public life. Mail coupon below. No obligation.

LA SALLE EXTENSION UNIVERSITY
A Correspondence Institution

417 S. Dearborn St. Dept. 583-L Chicago 5, ILL.

Send me your two FREE booklets described above, without obligation.

*Name*_____ *Age*_____

*Street*_____

*City, Zone & State*_____

New! Combination!

Fluorescent EMERGENCY LIGHT

Goes on Automatically When Your Regular Power Fails

'LIGHT WATCHMAN'

Safety and convenience for home, office, school, store, factory, farm, theatre, hotel. Perfect wherever crowds gather. Light goes on the instant your regular power fails — automatically. Simply plug into any A.C. outlet. Light-weight, compact. Convenient handle for carrying. Can be used as a portable work-light. Complete with batteries.

C.O.D. $29.95 plus postage
Send remittance and we pay postage.

NEVER BEFORE AN EMERGENCY LIGHT LIKE THIS AT THIS LOW PRICE

10 Day Money Back Guarantee

Light Watchman Sales Co. 30 Church Street New York 7, N. Y.

Copyrighted material

Don't Envy The PLUMBER·Be One

Make $15 to $50 a Day

Every skilled workman will tell you Plumbers have the best of it. WINTER and SUMMER the Plumber is busy at top wages. No skilled Plumber is ever out of a job. Compare his opportunities with any trade. To the man with know how, Plumbing means profit. Investigate Universal Plumbing School. Not a "war born School," but a plumbing school developed and operated by plumbers since 1923.

Own Your Own BUSINESS

Have your own business and big profits with little other than training and a kit of tools.

JOURNEYMAN

Gets Good Salary

Master Plumbers own their own shop. A Journeyman works for a Master. With this training journeymen can depend on high wages.

BE A PLUMBER IN JUST 32 WEEKS

Learn With Tools—Not Books

No need ever serve an apprenticeship. Don't envy the plumbers big profits—enjoy them. Learn every trick of the trade—Leadwork—Blueprint for plan reading, etc. under Licensed Master Plumbers.

Over 7,000 Successful Plumbers Recommend This School

This system has made more than 7,000 plumbers. Investigate our past performance. If you like to work with tools this is your opportunity. Become a Plumber in America's largest and only school devoted exclusively to plumbing. Write today for FREE information.

G. I. Approved. Established 1923

UNIVERSAL PLUMBING SCHOOL

800 Holmes Kansas City, Mo.

CHOREMASTER

ONE WHEEL GARDEN TRACTOR

The CHOREMASTER lightens and speeds lawn and garden tasks . . . yet this rugged unit provides auxiliary power for shop tools, pump, compressor . . . out on a job or away from electric power. Circular saw, power sprayer, cultivating tools, wagon, snow plow, riding sulky and other attachments available. Write for literature or see your dealer.

1 H.P. $135.00

2 H.P.* $149.00

with std. clutch

*(Centrifugal Clutch $10.00 Extra)

Attachments extra —Plus Freight

Special Products Division

The LODGE & SHIPLEY Co.

816-5 Evans St., Cincinnati 4, Ohio

STOP TAPPET NOISE!

Install ADJUSTABLE TAPPETS

for FORD and MERCURY V-8's (85-100 HP)

Johnson Adjustable Tappets guarantee better engine performance! Over 2,000,000 of these popular tappets are giving quiet, trouble-free service.

Simple and easy to install during valve grinding jobs.

Nothing complicated . . . no extra labor involved.

ASK YOUR SERVICE MAN OR NEAREST AUTOMOTIVE JOBBER TODAY

JOHNSON PRODUCTS INC. Muskegon, Michigan

BUY NO TRUSS

until you have sent for our FREE Book, explaining about this amazingly easy-to-wear device recommended by doctors everywhere. No annoying springs, belts, straps. Will not slip at work or play. Custom-built (by mail) to your measurements. Ingenious pad gives instant added support in case of extra strain. Light. Waterproof. Leaves hips free. The famous Cluthe has brought joyous relief to 350,000 users. Can help you. Write for FREE 72-page book of Advice and details of 60-day trial plan. Also endorsements of grateful users in your neighborhood. **Cluthe Sons, Dept. 11, Bloomfield, N. J.** (Serving the ruptured for 78 years—since 1871).

A NEW SENSATIONAL AUTO SEAT COVER

Introducing a New Sensational form fitting auto seat cover. Made with unbreakable seams, triple stitched and **no thread exposed.** Patent applied for. Savings up to 40%—buy direct from manufacturer.

Get the details on this revolutionary cover. Write Today for complete price list and FREE SAMPLES of material.

DEALER INQUIRIES INVITED!

MONO of HOLLYWOOD 6545 Santa Monica Blvd. Hollywood 38, Calif.

LEARN CHARACTER READING

SCIENTIFIC · EDUCATIONAL ENTERTAINING

Anyone can read character with the new, scientific simplified KEY-WORD CHARACTER chart. More than 100 illustrations to aid you. Printed beautiful colors. Contains new discoveries in Solar Electro-Biology, Human Temperaments, Cell Functions, Polar Forces, other character influences. Actual size—9" x 18". Have fun analysing friends, customers, neighbors. Send $1. today. Sent postpaid. Dealers Wanted.

Master Chart $1.00

ROBERT N. LATIMER • Apt. I-B

206 E. INDIANOLA, PHOENIX, ARIZONA

...FREE!....

Fluorescent Analysis Bulletin and 3 Fluorescent Mineral Samples with each order for this amazing lamp

Find hidden values — Uranium, Tungsten, Mercury. Thrill your friends with startling fluorescent effects in many minerals, oils, paints, fabrics and other household objects. Detect forgeries. Not a toy — identical lamp used by U. S. Gov't and by doctors, chemists, criminologists, prospectors, etc., professionally and in their hobbies. Exciting, educational. 110 volt A.C. Fully guaranteed. See your scientific apparatus dealer or write today for complete details. *Send 25c for 28-page informational file showing exciting possibilities of fluorescent analysis in many fields.*

Ultra Violet BLACK LIGHT

(short wave)

at a price you can afford to pay!

Mineralight "H"

only $12.50 postpaid

ULTRA-VIOLET PRODUCTS, Inc. Dept. 12

5205 Santa Monica Boulevard • Los Angeles 27, California

Copyrighted material

MONEY BACK if not delighted IN 10 DAYS

AMERICA'S BEST WATCH VALUES

WHOLESALE PRICES • DIRECT TO USER

ORDER WITH CONFIDENCE 1 YEAR WRITTEN GUARANTEE

15 JEWEL men's fully guaranteed WRIST WATCH

ORIGINALLY $30 - $55

Luminous dial . . . . sweep second hand . . . . water repellent . . . . shock protected . . . . anti-magnetic. Imported Swiss precision movement and case. Worth triple this low price. Only $13.95 plus $1.40 tax. Don't delay. Order now.

our price only $13.95

17 JEWEL 14-KT. LADIES' FILLED YELLOW GOLD WATCH

ORIGINALLY $39.75 our price only

A thrilling precision watch with beautiful cord band. Built for lifetime service. Shock protected construction. Lowest price ever. Only $14.95 plus $1.50 tax. Don't delay. Order now.

$14.95

17 JEWEL 2 PUSH BUTTON CHRONOGRAPH

ORIGINALLY $71.50 our price only

Thousands sold at $71.50. 2-push button combination wrist watch, stop watch, telemeter, tachometer. Incablock shock resistant feature. Sweep second hand. Anti-magnetic. Radium dial. Stainless steel back. Unbreakable crystal. Only $21.95 plus $2.20 tax. Order now.

$21.95

Sturdy WRIST WATCH

- SWEEP SECOND HAND
- LUMINOUS DIALS
- WATER-PROOF PLASTIC BAND

our price only $4.95

Sturdy, guaranteed men's watch. Built to keep accurate time. Many formerly sold at double this price and more. Yours now at only $4.95 plus 50c tax. Order now for self and gifts.

17 JEWEL SELF WINDING

ORIGINALLY $71.50 Our Price only $24.95

One of World's Finest. Needs no winding. Winds self as you move. Water and shock resistant. Anti-magnetic. Ace value at former $71.50 price. Now only $24.95 plus $2.50 tax. Order now.

17 JEWEL SHOCK PROOF WATERPROOF

ORIGINALLY $59 OUR PRICE only $16.95

Handsome, accurate. Has sweep second hand. Non-magnetic. Kept accurate time after 72-hour test under water. Amazing value at $16.95 plus $1.70 tax. Order now.

FREE! Handsome expansion band included free if you send full payment plus tax with your order.

ORDER DIRECT FROM THIS AD, FOR SELF, OR GRADUATION AND OTHER GIFTS. Lowest prices ever, for these guaranteed watches! Order now on famous 1-year written guarantee. Send only $1. down payment with order. Pay balance to postman on arrival plus postage. Or we pay postage if you enclose full payment plus tax with your order.

MARYLAND DISTRIBUTORS, Dept. 3, 501 E. Baltimore St., Baltimore 2, Md.

ORDER NOW!

JULY 4th FIREWORKS WHOLESALE PRICE

974 PIECES $4.98

ACTUAL RETAIL VALUE $13.60

This magnificent noise and beauty assortment includes 974 pieces—each a knock-out—gorgeous, colorful displays—intricate, artistic effects—all merchandise brand-new. For only $4.98 you'll get—Sparklers, Salutes, Whiz Bang Salutes, Red Trail Blazers, Repeating Bombs, Aerial Flashes, Rockets, Fire Cones, Roman Candles, 3-Shot Aerials, Chinese Rockets, Magic Black Snakes, Magic Flames, Airplane Flares, Chinese Firecrackers, Lady Crackers, Midget Flashes, Gold Comet Star. FREE PUNK!

Order this wonderful over-974-Piece Fireworks Bargain TODAY! Send money order, bank draft, or certified check for $4.98. Do NOT send cash. NO C.O.D. orders! PRINT name and address plainly. Give name of your Express office. Fireworks cannot be mailed. All shipments by Express, F.O.B. at Fort Worth.

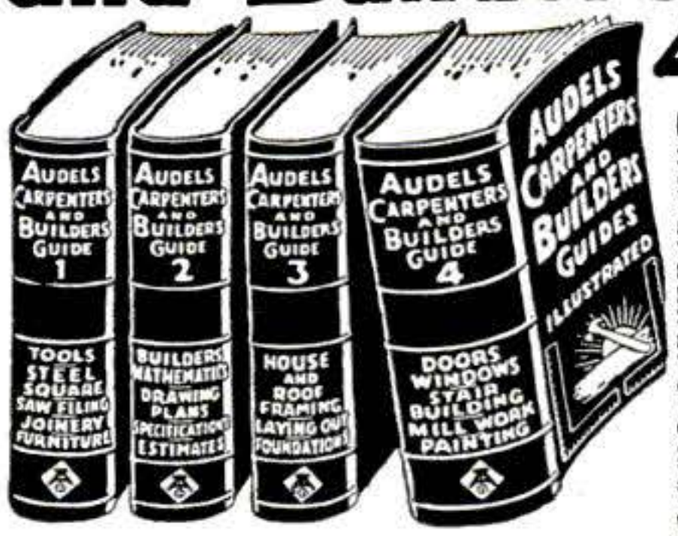
ASK FOR FREE CATALOG MANY OTHER ASSORTMENTS

Stars and Stripes Fireworks Co.

P. O. BOX 486, DEPT. S
FORT WORTH 1, TEXAS

NOT INTENDED TO OFFER FOR SALE IN LOCALITIES WHERE REGULATIONS PROHIBIT

AUDELS Carpenters and Builders Guides 4 vols. $6



Inside Trade Information for Carpenters, Builders, Joiners, Building Mechanics and all Woodworkers. These Guides give you the short-cut instructions that you want—including new methods, ideas, solutions, plans, systems and money saving suggestions. An easy progressive course for the apprentice and student. A practical daily helper and Quick Reference for the master worker. Carpenters everywhere are using these Guides as a Helping Hand to Easier Work, Better Work and Better Pay. To get this assistance for yourself, simply fill in and mail FREE COUPON below.

Inside Trade Information On:

How to use the steel square—How to file and set saws—How to build furniture—How to use a mitre box—How to use the chalk line—How to use rules and scales—How to make joints—Carpenters arithmetic—Solving mensuration problems—Estimating strength of timbers—How to set girders and sills—How to frame houses and roofs—How to estimate costs—How to build houses, barns, garages, bungalows, etc.—How to read and draw plans—Drawing up specifications—How to excavate—How to use settings 12, 13 and 17 on the steel square—How to build hoists and scaffolds—skylights—How to build stairs—How to put on interior trim—How to hang doors—How to lath—lay floors—How to paint.

AUDEL, Publishers, 49 W. 23rd St., New York 10, N. Y.

Mail Audels Carpenters and Builders Guides, 4 vols., on 7 days' free trial. If OK I will remit $1 in 7 days and $1 monthly until $6 is paid. —Otherwise I will return them. No obligation unless I am satisfied.

Name_____

Address_____

Occupation_____

PSM

Employed by_____

Copyrighted material

Sensational New Electric

① WELDER ② CUTTER!

NOW! 10 DAY TRIAL

BOTH only $12

INSTRUCTIONS INCLUDED

The WELDRITE combination–tested and proven by countless commercial and amateur users, is now offered direct to you at the amazingly low price of only $12.00. No Gas–No Gauges–No Spark Lighter needed. Always ready for immediate use–Just plug WELDRITE into 110-115 AC or DC outlet. Uses standard welding and brazing materials available at all welding supply stores.

Uses 110-115 AC or DC

WELD - BRAZE - CUT

MELT - SOLDER - HEAT TREAT

WELDRITE furnished complete with Converter Unit, #1 Single Holder with attached Alligator clip, for welding metal up to 3/16" thickness, using up to 3/32" rod, and #2 Double Holder with Copper Coated Dual Carbon Electrodes for Cutting, Brazing, Heat Treating, Soldering, etc. Starting welding materials and instructions included.

Ideal for home workshop. Invaluable for body and fender shops, garages, repair and machine shops, manufacturers, etc.

WELDER HOOD
With Wilson Weld Lens No. 10, approved by American Optical Company. Used in Hoods costing to $10, only **3.95**

NAME _____

ADDRESS _____

SEND NO MONEY! 10 DAY TRIAL OFFER
Order your WELDRITE Electric WELDER-CUTTER C.O.D. today. Pay postman $12 plus postage charges (wt. 4 lbs.) or send $12 and we pay postage. Either way, if not satisfied, return WELDRITE in 10 days, and money will be refunded. WELDER HOOD–Approved lens found in hoods costing to $10–only $3.95.
California orders please add 2½% sales tax.

☐ Send Weldrite C.O.D. $12 plus P.O. charges.
☐ Send Weldrite & Hood C.O.D. $15.95 plus chgs.
☐ Send Weldrite postpaid. I enclose $12.
☐ Send Weldrite & Hood postpd. I enclose $15.95
Same 10 day Trial Offer
☐ Send Free Folder.

CALIFORNIA TECHNICAL PRODUCTS CO.
448 So. Hill St., Los Angeles 13, Calif. Dept. B-5

WAR SURPLUS

BIGGEST BARGAINS IN YEARS

HAND HYDRAULIC PUMP BRAND NEW. Use it for hydraulic jacks, presses, hoist, etc. For operating hydraulic cylinders, to pump oil or hydraulic fluid under pressure. Ruggedly constructed, built by WEAVER. The handle is telescoping, length variable from 12" to 20". Has built in check valve and is capable of delivering 1000 lbs. of pressure. Dimensions, 8" long x 6" high x 4" wide. Wt. 10½ lbs. A $50 value, directions incl. Now.. **$12.50**

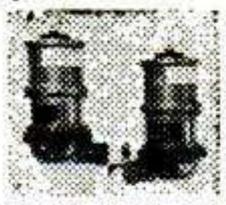
VICKERS CONSTANT DISPLACEMENT HIGH PRESSURE PUMP. Use it for any type liquid pumping job. 375 gal. per hr. at 3750 R.P.M. 1000 pounds pressure per sq in. Can be used as hydraulic motor. O. Acq. cost $100 Brand New. Wt. 7 lbs. Directions incl..... **$12.50 post paid**

BRAND NEW CHECK & RELIEF VALVE adj. for any pressure ..... **$2.50 postpaid**

BRAND NEW HYDRAULIC CONTROL VALVE. This is a TWO CYLINDER DOUBLE ACTION VALVE with unique arrangement allowing the operator to raise both cylinders simultaneously, to lower them simultaneously, or to raise one and lower the other at any predetermined rate and speed. BRAND NEW. A $75.00 value..... **$12.50 post paid**

SPEED REDUCER, 10-1 or 5-1 ratio 90 degree angle. Shaft Driven ½" spline shaft, with 3 mounting holes 5/16". Only..... **$4.50**

DYNAMOTORS. All Brand New. Type S-3416, Input 9V, output 400 V 7 amps and .08 amps. Ea..... **$2.75 postpaid**
Dyn. Model DY-22/ARC input 28V D.C. Output 210V D.C. Cont. Duty. Ea..... **$1.95 postpaid**
Dyn. New Model 23350 input 27V D.C Output 285V D.C. Ea. ..... **$1.75 postpaid**



Sensational Fascinating Mysterious **SELSYN.** Two or more connected together work perfectly on 110V A.C. For weather vanes, rotating directional antennas or controlling distance operations. Complete with diagram and instructions. (wt. 3½ lbs.) PER PAIR..... **$3.50**

NEW CUNO OIL FILTER aircraft type keeps oil clean without cartridge replacement. For all Autos, Trucks and Tractors. Install at home in a few minutes. STOP CHANGING MOTOR OIL. Instructions incl. Ea..... **$4.95**

ELECTRIC MOTOR. ½ H.P. 27V D.C. R.P.M. 4000, No. 750 for intermittent or continuous duty 5/8" shaft. VARIABLE SPEED MOTOR. Can be adapted to 110 Volt A.C. or R.E.A. line by rearranging armature brush leads. UNUSED. Instructions incl..... **$5.50**

Send check or money order. No c.o.d's. Prices f.o.b. K.C.

GENERAL SALVAGE COMPANY
Dept. 27, 2920 E. 27th St. Kansas City, Mo.

- HOME ASSEMBLED
- MASS PRODUCED
- LOW-COST AUTOMOBILE

WORLD'S LOWEST PRICED CAR

Drive this car for as low as 50c per week. Up to 90 miles per gallon. 45 to 50 m.p.h. Large enough for a husky six footer. A pleasure to assemble. Just bolt together our precision built parts. Get the facts. Send 25c for detailed circular with large photo, 4 view drawings, price of all parts. Better still, send $1 (refunded first order) for this plus actual assembly book with 42 photos, drawings, blueprints of snow and ice conversions, etc.

MIDGET MOTORS MFG. CO., Athens 2, Ohio

Learn RADIO-TELEVISION

In Your Own HOME WORKSHOP

Build interesting Radio Circuits, acquire real experience, do scores of practical experiments — all through RTA's complete balanced training plus 10 BIG KITS of parts which RTA GIVES YOU! Get finest instruction direct from Hollywood, nerve-center of broadcasting, television and radio activities.

FREE BOOK
Send postal for complete details plus FREE BOOK "How to Make Good in Radio-Television."

RADIO TRAINING ASSOCIATION OF AMERICA
5620 Hollywood Blvd. Dept. 5-PS Hollywood 28, Calif.

LEARN MEAT CUTTING

through actual practice. Profitable Meat Cutting and Successful Meat Merchandising taught easily, quickly. LEARN BY DOING at Toledo in just six short weeks under actual market conditions. For beginners or men with experience. All subjects taught thoroughly and completely. Diploma. Job help. Get store of own. People must eat. School in operation over 25 years. Approved for GI training. Send today for FREE illustrated catalog. No obligation.

NATIONAL SCHOOL OF MEAT CUTTING, Dept. 51-H, Toledo 4, Ohio

DUST-O-VAC FOR ALL MACHINES

For Home Workshops & Industry. DUST-O-VAC collects & bags wood & plastic chips, wood & metal dust, wood shavings. *Free Bag.* Attaches to circular saw, planer, band saw, grinder, belt or disc sander, shaper, drill press with shaper or sander attachment, spindle shaper, wood lathe, jig saw. 110 A.C., D.C. *Send for mounting instr. for all machines.*

$19.95

Free Ship. east of Miss. West of Miss., add $1. Check, M.O.

UNIVERSAL YONKERS CORP., 137 Alexander St., S-5, Yonkers 2, N. Y.

$10,000 REWARD

Earn the government bonus by locating Radio-Active Ores with the

P.R.I. GEIGER COUNTER

Weight about 2 lbs. Price only $75.00 complete. Enclose check to save C.O.D. charges.

PRECISION RADIATION INSTRUMENTS, INC.
1101-F N. Paulina St. Chicago 22, Ill.

BIG PROFITS RESTRINGING RACKETS

AT HOME! WRITE US!

Earn big profits restringing tennis rackets at home. Easy work. Experience unnecessary. **Save** on **your** tennis, badminton, squash! **Send** for FREE CATALOG of Tennis Equipment—*Hurry!*
H. E. Wills Co., 1047 W. 47th St.
Dept. PS-59, Chicago, U. S. A.

Save On GUT! —Buy Direct from Factory SILK!

Copyrighted material

ELECTRICITY *Anywhere*

for HOMES FARMS SHOPS BOATS RADIO USE

● Onan gasoline-engine-driven Electric Plants supply reliable, economical electric service for any use. Portable, stationary or stand-by models. Water or air-cooled, compact and rugged.

A.C.: 350 to 35,000 watts in all standard voltages and frequencies. D.C.: 600 to 15,000 watts, 115 and 230 volts. BATTERY CHARGERS: 500 to 3,500 watts: 6, 12, 24, 32 volts.

Write for folder

D. W. ONAN & SONS INC.

2795 Royalston Ave., Minneapolis 5, Minn.

Onan PRODUCTS

BUILD YOUR OWN FAN

One-piece cast aluminum propellers for cooling and ventilating.

Size Inches	Polished 2 Blade	Polished 3 Blade	Unpolished 2 Blade	Unpolished 3 Blade	Bore Inches
15	$3.00	$4.00	$2.50	$3.00	½, ⅝, ¾
18	3.75	4.50	3.00	3.50	½, ⅝, ¾
20	4.00	5.00	3.25	4.00	½, ⅝, ¾
24	4.50	5.50	4.00	4.50	½, ⅝, ¾

Let us give you our prices on your aluminum castings.

Write for pamphlet on larger fan blades, wire guards, fan bases, shutters, pillow blocks, exhaust fan frames, etc., shipped prepaid if money accompanies order. Dealers write for discount.

KLOPPENBORG ALUMINUM FDY., Dept. PS59, Davenport, Iowa

NEW! MINIATURE DUST MASK

Wear when sanding, grinding, paint spraying, sweeping, dusting, furnace cleaning, etc. Handy as a pair of glasses. Just keep mouth closed and breathe through nose is all you do to operate. Protects against dusts, lint, coal, cement, grain dust. **Has 9 sq. in. filter.** Order today.

Order Today $1.00 POST PAID

JERRY BRYANT, Dept. PS, 919 N. Michigan Ave., Chicago 11, Ill.

FIREWORKS

701-PIECE ALL-NOISE ASSORTMENT

Bigger and better than ever! Contains many Cherry Bombs, Aerial Bombs, Chinese Crackers, Lady Crackers, Salutes, etc. Shipped Express same day order received. Name nearest Express office. No C.O.D.

Supply limited. Order early . . . only $3.95

JAYHAWK FIREWORKS BLUE RAPIDS, KANSAS

"PLASTICS"

FABRICATING MANUAL AND CATALOGUE

Work in a fascinating and profitable hobby. Just out—our latest fabricating manual. Tells you how to work with Plastics. Our new Catalogue provides all needed materials: Plexiglas—Lucite—Tenite—Catalin—Acetate—all in sheets, rods, and tubes. Complete line of cements, dyes, accessories and supplies. Send 20c today for 1949 Catalogue and Handbook.

HOUSE OF PLASTICS

8648 Linwood Avenue Dept. MO 5 Detroit 6, Michigan

WORLD'S LOWEST PRICED ADDING MACHINE

Vest Pocket Size FREE TRIAL

IDEAL FOR BUSINESS AND PERSONAL USE—GUARANTEED ACCURATE. Not a toy. Operates with only a finger flick. Adds, subtracts, multiplies, divides. Counts up to one billion. Pays for itself over and over. Ideal Gift—for Business, Income Tax and School use. MONEY BACK GUARANTEE. Send name and address. Pay postman only $2.95 plus postage. (Send full cash if outside U.S.) Beautiful rich-looking Leatherette Case included at no extra cost. Money back in 10 days if not delighted. AGENTS WANTED.

only **$2.95**

TOTAL COST SEND NO MONEY

CALCULATOR MACHINE CO., (Mfrs.)

Dept. 512, P.O. Box 248 Glenview, Illinois

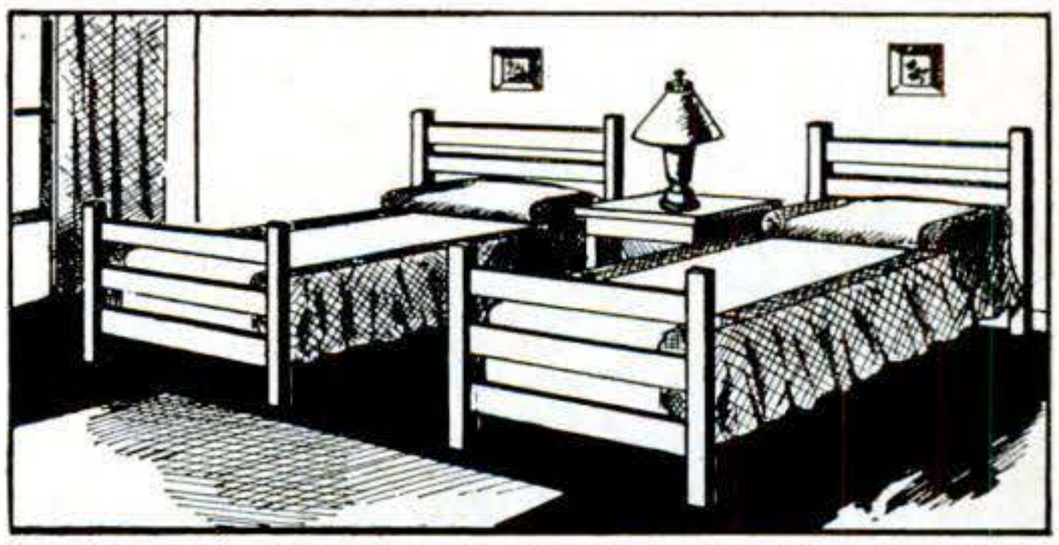
DOUBLE BUNK BEDS

Complete Set $27.50

$50.00 VALUE

This price includes two (2) hardwood beds two (2) thick cotton mattresses and two (2) fluffy feather pillows.

TWIN BEDS



Our purchase of over 5,000 **hardwood beds** from the U. S. Air Force makes this low price possible. These beds can be made into double bunks or twin beds and are real space savers for your summer cabin, guest room, children's room, etc. These beds are of sturdy hardwood construction. Will hold over 600 lbs., 30" wide, 76" long. Mattresses have new ticking. The pillows have had the feathers removed, and cleaned in live steam. The ticking washed and bleached then refilled with soft fluffy, clean feathers. All sterilization regulations have been complied with. Seal is on all mattresses and pillows. Shipping weight for complete set (2 beds, mattresses, pillows) is 150 lbs.

Price for one (1) twin bed, one (1) mattress, and one (1) pillow **$14.00,** shipping weight 75 lbs.

Steel beds also available same weight, size and price as above.

All beds shipped via truck or rail freight f.o.b. Fresno.

NEW 100% WOOL BLANKETS

Size 64" x 84"—Color, grey—**$5.95 ea. We pay all postage** or express charges on this item.

Pay by money order or check. 50% deposit on C.O.D.'s. **All orders filled promptly.**

ARMY SURPLUS SALES

OF FRESNO

1820 Tulare Street Fresno, Calif.

PRECISION JEWELERS SCREW DRIVERS

Complete Set of 8 for Every "Hobbyist"

AT LAST— a complete set of precision screw drivers to meet the needs of every model builder. Not a miniature but the same type set used by U. S. Navy for precision instruments and watches during the war. Brass knurled handles, hexagon heads, finest tempered steel blades. Sizes 2-9. Never before a set of this quality and precision at such a low price. Your money back if not satisfied. C.O.D. $2.00 plus postage or send $2.00 and we pay postage.

PINE WATCH CO., Rm. 40, 29 Eldridge St., New York 2, N. Y.

Copyrighted material

Draw me!

$1000.00 in Valuable Prizes

1st, 2nd, and 3rd prizes . . . COMPLETE ART COURSES including Drawing Outfits (Value of each course $240.00); 4th, $100.00; 5th, $50.00; 6th, $30.00 and 10 prizes, $10.00 each.

Copy the girl and try for a prize! Splendid opportunities now for *trained* artists in all fields. Find out how much ability you really have. Mail this coupon with your drawing.

ART INSTRUCTION, INC.
Dept. 5149C, 500 South Fourth Street, Minneapolis 15, Minn.
Please enter my drawing (attached) in your $1000.00 contest for May. **(Please Print)**

*Name*_____

*Occupation*_____ *Age*_____

*Address*_____ *City*_____

*Zone*____ *County*_____ *State*_____

RULES:

You must be amateur. Our students not eligible. Make copy of girl 5 inches high. Pencil or pen only. Omit lettering. All drawings must be received by May 31, 1949. None returned. Winners notified. If desired, send stamped, self-addressed envelope for list of winners.

$5,785.00 A Year in AUTO BODY and FENDER REPAIR

Says a **STEVINSON SCHOOL** *Graduate*

That's the possibilities of this old, established, profitable field. Men with "know how" and aptitude for this business should make up to $110 weekly. If you like to work with tools, investigate this school.

Own your own Business, or have a Big Pay Job

Keep busy at top pay all year around . . . No slack season. JUST 36 WEEKS show you the tricks of the trade. Write for FREE information. G.I. Approved. Est. 1922.

STEVINSON AUTO & ELEC. SCHOOL
2006 Main **Kansas City, Mo.**

Stay dry as you wash your car easily and quickly. Great for women. Comfortable grips keep hand warm. Reaches all parts, light weight, 45" long. Free-flow, replaceable mop; holds more water for pail use. No control valve to cause back pressure—saves hose. Coil spring fits in your hose,* prevents breakage. W. S., Minn., says: "I paid twice your cost for one; it's too clumsy. Yours is so easy." Don't accept less. Send check or M.O. Guaranteed.

KEELCRAFT, W. Englewood, 2, N. J.

FOR ALL MAKES AND MODELS

DOUGLASS Steel-Pack MUFFLERS

Performance that excels • Stamina that endures

Rugged construction. Steel tubing. Straight-thru-design. Solid tube with steel packing. "Throbbing Deep Tone." Complete for Easy Installation Satisfaction Guaranteed

32-40 FORD V-8	$5.96	29-48 CHEVROLET	$5.96
41-49 FORD V-8	6.85	31-41 PLYMOUTH	5.96
39-49 MERCURY	6.85	42-48 PLYMOUTH	6.85
35-49 FORD & MERCURY DUAL SETS			$23.00
49 FORD & MERCURY DUAL SETS			25.00

ORDER NOW! Specify Year and model • Enclose Money Order or Check with Order. Dept. S-5

1949 COMPLETE RACING EQUIPMENT CATALOG 25c
WRITE RACING EQUIPMENT DIVISION

DOUGLASS MUFFLER MANUFACTURING COMPANY - 1916 W. VALLEY BLVD. - ALHAMBRA, CALIF.

Dealer Inquiries Invited

SET THE PACE WITH THE Powell P-81!

- Cruises at 45 MPH—with faster pickup than car
- 39" high, 71" long overall, wt., 190 lbs.
- 8 HP motorcycle engine
- 50 miles to the gallon
- Automatic clutch
- Internal expanding brakes — handle-grip throttle controls

ONLY $247.34 AT COMPTON, CALIF. EXCISE TAX INC.

POWELL MANUFACTURING COMPANY
DEPT. PS-54-9 • COMPTON, CALIF.

Write for FREE folder and name of nearest dealer

Copyrighted material

YOUR GUIDE TO A SUCCESSFUL FUTURE

Auto Mechanics
Body-Fender
Diesel Mechanics
Drafting
Learn A Trade

Radio-Television
Refrigeration
Electricity-Electronics
Building Trades
Earn More Money

The years ahead are going to be big. Grow with them. Prepare now to get into a great, growing industry. Train with C.T.I.—a Nationally Known School. Get the benefits of our efficient Placement Service whether you want a better job or business of your own. You can come directly to our big, well equipped shops, located only a block from the shores of Lake Michigan—or you can begin your training at home by C.T.I.'s SHOP-PROVED HOME TRAINING METHODS. Fill out coupon—mail it today for big, illustrated FREE booklet.

VETERANS—Just mail coupon, we will handle all details.

NON-VETERANS—Don't let the lack of ready cash prevent you from taking this training now. Investigate our Low Easy-Payment Plan and our Pay-After-Graduation Plan.

COMMERCIAL TRADES INSTITUTE, Dept. E1-5
1400 Greenleaf Ave., Chicago 26, Ill.

FILL OUT · CUT OUT · MAIL TODAY!

FACTS FREE FOR MEN WHO WANT TO GET AHEAD

COMMERCIAL TRADES INSTITUTE, Dept. E1-5
1400 W. Greenleaf Ave., Chicago 26, Ill.

Send free illustrated Brochures and other information about the field I have checked below.

- ☐ Body & Fender Repairing
- ☐ Automotive Mechanics
- ☐ Diesel Mechanics
- ☐ Radio
- ☐ Television
- ☐ Electricity
- ☐ Building
- ☐ Drafting
- ☐ Refrigeration and Air Conditioning

Name _____

Address _____

City _____ State _____

☐ Veteran ☐ Non-Veteran

WAR SURPLUS VALUES

ARMY SLEEPING BAG

Genuine Army surplus. 100% wool. 30" zipper. Reissue—guaranteed like new. Complete with water repellent cover. **3.95**
Add 25c for mailing.

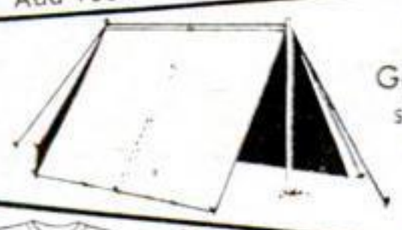
AIR CORPS TYPE SUNGLASSES

Brand new. 4 base optically ground lens. 24 karat gold plated frame. Pearloid brow rest. Complete with case. **1.88**
Add 10c for mailing.

OFFICER'S PINKS

Brand new. Fine quality officer's elastique trousers. Sizes 29 thru 42. Reg. $17.95 value. **11.50**
Add 25c for mailing.

ARMY PUP TENT

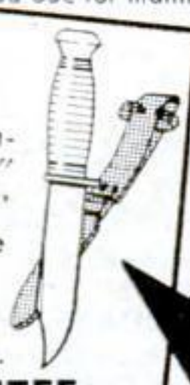


Genuine Army surplus. Full size. Reissue — guaranteed perfect condition. Complete with poles and pins. **3.95**
Add 35c for mailing.

NAVY T-SHIRT

Brand new. First quality. Snowy white, soft fine knit cotton. Sizes small, med., large. **4 for $2**
Add 15c for mailing.

NAVY KNIFE



Brand new. Tempered steel 5¼" "Parkerized" blade. Complete with sheath. **98c**
Add 10c for mailing.

SEND FOR FREE CATALOG

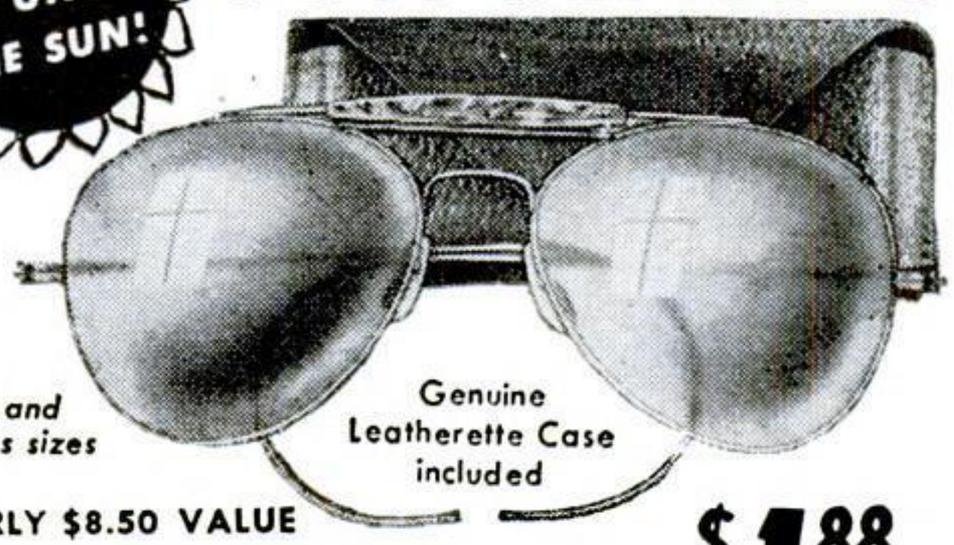
MONEY BACK GUARANTEE

NATIONAL JOBBING CO.
BOX 1485 Dept. S-4 Omaha, Nebr.

BEST BUY UNDER THE SUN!

U. S. Army Air Force Type

SUN GLASSES



Men's and Women's sizes

Genuine Leatherette Case included

FORMERLY $8.50 VALUE

Super-Sensationally Priced at only . . . $1.88 postpaid

- ★ **Cool green meniscus curved, polished lenses.**
- ★ **Gold Plated adjustable frames**
- ★ **Pearloid Sweat-bar and Nose-pads**
- ★ **Reinforcing bar for greater durability**
- ★ **Lenses meet specification of U. S. Gov't. Bureau of Standards.**

LIFETIME GUARANTEE
Included with every pair of glasses

10-DAY TRIAL • MONEY-BACK GUARANTEE

MAIL THIS COUPON TODAY!

CHICAGO GOGGLE SALES CO., Dept. 111
20 E. Delaware Pl., Chicago 11, Ill.

Please send me .... Men's .... Women's Sun Glasses.

☐ Send C.O.D.
☐ Enclosed find $..... Mail Postpaid.

Name.....

Address.....

Town..... State.....

Copyrighted material

THERE'S GOLD in GOOD IDEAS!

• Rochester, New York, with its nationally known industries and progressive business community, is constantly seeking new ideas which can be converted into profitable products or enterprises. If you have something worth talking about,—something for which there is a market at a minimum price,—then write for details to Division of Public Relations, Rochester Department of Commerce, 54 Court St., Rochester 4, N. Y.

IN ROCHESTER, GOVERNMENT *HELPS* BUSINESS

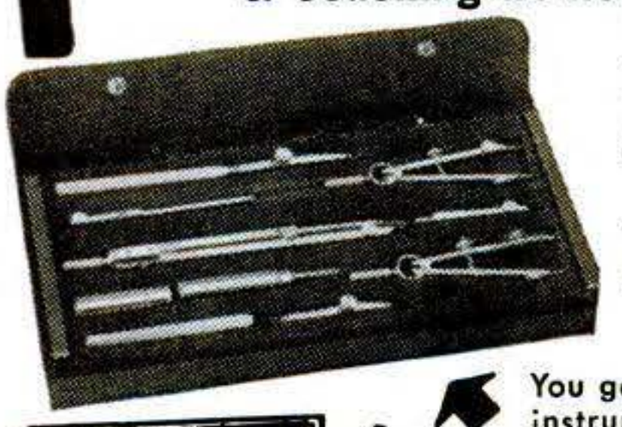
Where Will You Be in SIX MONTHS?

GOOD JOB
SECURITY
GOOD PAY

NO JOB
NO INCOME
NO FUTURE

GET INTO DRAFTING

It's Easy if You Use CEI Simplified Training & Coaching at Home in Spare Time



You want security, a home, a car, a bank account, freedom from money troubles. You can have them in Drafting. FREE personally supervised, specialized resident school training is available to graduates.

IN A FEW SHORT WEEKS YOU CAN BE READY FOR A GOOD PAY JOB IN DRAFTING

You get FREE this professional set of instruments and complete drafting equipment to make training easy.

Get FREE 1949 Success Book

MAIL COUPON NOW

CLEVELAND ENGINEERING INSTITUTE,
Extension Div. PS-5
2325 Chester Ave., Cleveland 14, Ohio
Rush your FREE 28 page Success Book showing how EASY it is to have security in Drafting.
☐ Veterans check here.

NAME.....
ADDRESS.....
CITY.....STATE.....
No obligation—No salesmen

HAND SIGNAL LAMP—Precision-built 5 colored lens turret (1"—Red, Green, Blue, White, Clear). Adj. trigger switch, & V-sight. Uses 2 flash cells. Black wrinkle finish. With 2 bulbs. Shpg. wt. 5 lbs.....**While they last** **$2.98**

ROTARY POWER SWITCH (H&H)—Hvy duty Double Pole, 3 pos. & OFF. Rated 15A/125V. 1/4" shaft. Flame-proof bakelite case 2" O.D. x 2". Shpg. wt. 1 lb.....**Only** **98c**

SPECIAL **110V. AC INDUCTION MOTOR** SPECIAL

(GEN'L Industries—RM-4) .4 shaded pole, .65 amp. 1750 RPM. Silent operating for PHONOGRAPHS, RECORDERS, FANS, DISPLAYS, POLISHING, BUFFING, ETC. 5/16" O.D. shaft; 3 3/8" sq. x 2 3/4". Less turntable, mtg. plate & drive wheel. Shpg. wt. 6 lbs. **A Steal at** **$4.95**

DON'T MISS THIS!!—NEW "JUMBO" RADIO PARTS ASSORTMENT. A GIANT KIT of new & dismantled RADIO & ELECTRONIC PARTS—17 FULL POUNDS of COILS, TRANSFORMERS, HARDWARE, CONTROL, KEY, WIRE, RESISTORS, CONDENSERS, INSULATORS, ETC., ETC. ALL THESE & MUCH MORE. (Shpg. wt. 21 lbs.).....**For Only** **$2.95**

WHIP ANTENNA SECTIONS—INCREASE RECEPTION on Portable or Home sets. 38" steel sections screw together to any length. 1/2" O.D. Shpg. wt. 1 lb. Per Sect. **39c** **3 for $1.00**

20% Deposit on all COD's. Please add sufficient postage

LEOIONE MIN. ORDER $1.00 65A DEY ST. NEW YORK CITY

FIREWORKS

CHINESE FIRE CRACKERS

1 Bundle or 1280—1 1/2" Crackers..... $2.50
1 Bundle or 1600—1 1/2" Crackers..... 3.00
8 Bundles to a case

BALLOONS—LATEX RUBBER

No. K 10, per gross..... $1.00
No. K 20, per gross..... 2.40

Wholesale only. Send Remittance with Order.

UNITED FIREWORKS MFG. CO., INC.
Dayton 7, Ohio

Genuine

U.S. NAVY SUN GLASSES

Postage Prepaid On These Items

• Ground and polished lens, beautiful in design, metal through plastic bows, in attractive case. $3.95 value. As shown. ..... **98c Pr.**

• We have a few pair of sun glasses left, the same that are now being used by the U. S. Army Air Corps, 6 base, ground and polished. These formerly sold for $15.00. Special while they last! ..... **$3.95 Pr.**

• Willson Eye Cup Safety or Chipper Goggles with 50 MM shatter proof lens. ..... **75c Pr.**

• Dockson or Willson Coverall or Eye Cup Welding Goggles with either No. 4 or No. 5 shade. A $2.75 wholesale value! ..... **$1.50 Pr.**

B & M DISTRIBUTING CO.
Dept. PS-A 2016 E. 11th Street Tacoma, Washington

ELECTRIC TOOL KIT,
Casco hand, new, complete with 15 accessory tools..... **$14.95**
With metal case and 35 tools.....$19.95

ELECTRIC CLIPPER,
Wahl, brand new, size 000, special..... **$9.75**

DUPLEX SLIDE RULE,
10 inch, value $10, special..... **$5.95**

WEATHER BAROMETER
S. & A., Anchor Style, all brass precision instrument **$12.50**

AUTO COMPASS,
Hull, new, Value $3.95, special..... **$2.75**

LENSATIC COMPASSES,
U.S. Govt., like new, cost $12.50, special..... **$2.95**

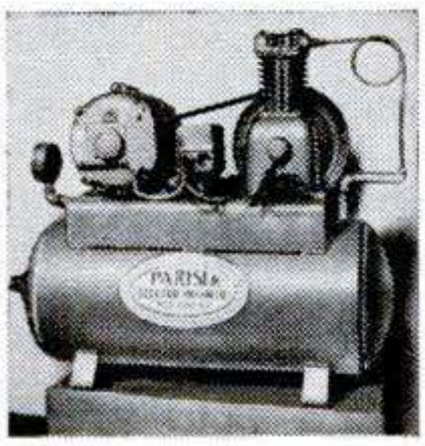
4th Annual Gun Digest and our New Catalog, $1.50. Catalog separate, 25c.

PUBLIC SPORTS SHOPS
11 S. 16th St., Phila. 2, Pa. (No COD's)

Copyrighted material

AIR COMPRESSORS

NEW LOW PRICES!



Complete with motors

¼ H.P. $49.50 (Reg. $79.50)

⅓ H.P. $55.00 (Reg. $89.50)

FULLY AUTOMATIC—EASY TO USE! Piston type, 2" bore, 1¾" stroke. High pressure steel tank, 12" x 23". AC-110 volt Capacitor Motor. Shut off at 60#. Start at 40#. 2.55 C.F.M. Splash lubrication. "V" belt drive. Cord & Plug.

SPECIAL! ½ H. P. AIR COMPRESSORS. High pressure tank 14" x 30"—A.C. Automatic 110-220 Volt Capacitor Motor—3.3 C.F.M.—150 lbs. Max. Pressure—Shut off at 125#—Start at 85#. **$89.50** (Reg. Price $127.50)

For inflating tires, spraying, lubricating, dusting, operating air tools. Saves money, time, labor!

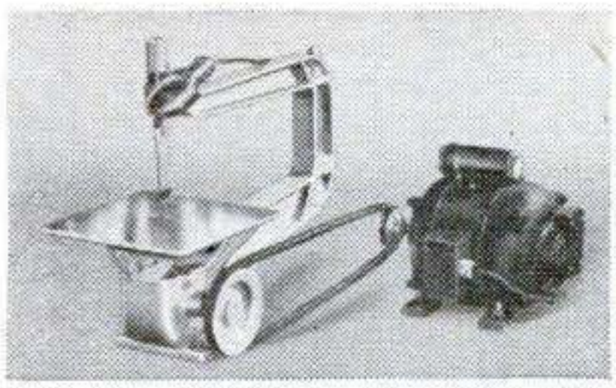
FULLY GUARANTEED. FOB. WHSE., NYC.
25% DEPOSIT WITH ORDER.

PARISER ELECTRIC MOTOR CO., INC.
Dept. PS-5, 165-167 Centre St., New York 13, N. Y.

Learn TELEVISION RADIO—ELECTRONICS

Prepare in spare hours for good pay in Television, Radio and Electronics. Train at home with Frank L. Sprayberry, America's outstanding Radio instructor. Big Kits of equipment furnished. Build testers, sets, etc. VETERANS: Approved for Training under GI Bill. Rush name and address for details and 2 BIG RADIO BOOKS—**ALL FREE!** No salesman will call. Write today!

Sprayberry Academy of Radio, Dept. 55-R
20 North Wacker Drive, Chicago 6, Illinois



JIG & SABER SAW with TILTING TABLE

Professional model. As Saber—upper arm removable, work not confined to throat depth. As Jig—cuts to center of 24" circle, work up to 2" thick. Table tilts 45°, grad. scale. All-metal, smooth stroke, runs in oil. Working parts hardened. Fully Guaranteed. **$12.95 ea.**

Send Check or M.O., we ship Prepaid; or send $2.00, we ship Exp. Coll. (Jig-Lite extra, $1.95. Motor not inc.)

HOB-E-EZE Box 396 Niles, Mich.

Bleed your own
HYDRAULIC BRAKES
Easily—Efficiently
with a KAR BRAKE BLEEDER

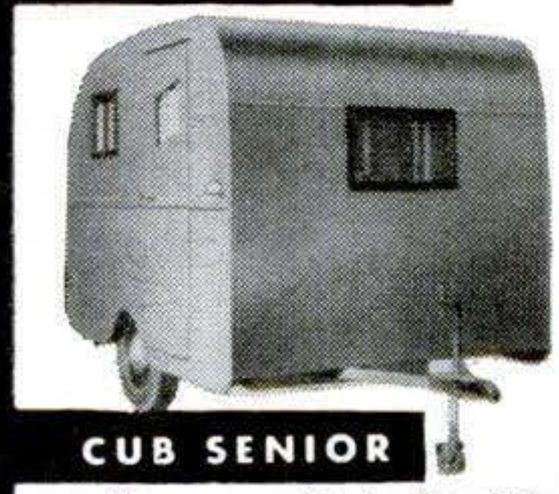
If the hydraulic brakes on your car require bleeding, don't pay expensive garage service. You *alone* can easily bleed them with a KAR BRAKE BLEEDER. After attaching to hydraulic system, pump brake pedal until proper pressure forces air out. Fits nearly all makes of cars, including G. M., Chrysler cars through 1940, and Fords. Only $2.00 postpaid. Send check or money order today.

KAR DISTRIBUTING CO.
719 Kelly Ave. Pittsburgh 21, Pa.

ASSEMBLE YOUR OWN TRAILER

CUB SPORTSTER

SAVE UP TO 50%



CUB SENIOR

Enjoy the luxury of owning one of these sturdy, streamlined trailers. Save up to half the normal cost by assembling it yourself. *For practically material costs alone,* you can buy the full-size CUB SPORTSTER or CUB SR. trailer in construction kit form.

In only a few hours, using a screwdriver, hammer and wrench, either trailer can be easily assembled. Precision cut, factory-finished panels and sub-assemblies are guaranteed to fit.

Both trailers have sleeping room for two adults and two children, thus they can pay for themselves during one vacation. *Many Cub trailer owners make extra money by renting their trailers for week-end and vacation trips!*

The CUB SPORTSTER has a rugged all metal body and all steel frame that weighs only 450 lbs. It is 12′ 7″ long, 6′ wide, 5′ in height and it adds only 75 lbs. tongue weight to your car. The CUB SPORTSTER kit includes a galley, ice box, wheels, fenders and all parts except tires and tubes.

Only **279.50** plus tax
F.O.B. Los Angeles

The CUB SENIOR can't be matched in either price or quality. A walk-in trailer, it has plenty of room for everything in pre-assembled cupboards, drawers and a spacious closet. Built-in dinette bed, sink, ice box and two fold-away tables give you all the comforts of home. The CUB SENIOR is 10′ long (8′ body length), 6′ 4″ wide and 6′ 9″ in height. It has an all steel frame and all parts are included except tires and tubes.

Only **395.00** plus tax
F.O.B. Los Angeles

(C.O.D. shipment will be made on either trailer if at least $50.00 deposit accompanies order.)

Write today for FREE illustrated folder.
Dealer inquiries are invited

National Trailer Stores

Box 2353, Dept. S-59, Terminal Annex
LOS ANGELES CALIFORNIA

AMAZING NEW HOLLYWOOD PLAN

Yes, YOU can draw GIRLS, CARS, FRIENDS and even MAGAZINE COVERS. It's so simple, no matter what your age. Many artists make more than $150.00 per week in advertising and cartoons. Be your own boss, draw for money *anywhere*. Our Commercial Artists will teach you the secrets from HOLLYWOOD. Drawing materials furnished. Be a success. Write NOW for *free* details

HOLLYWOOD SCHOOL OF ART

6533 Hollywood Blvd.
Hollywood 28, Calif.

Age.....

Name _____

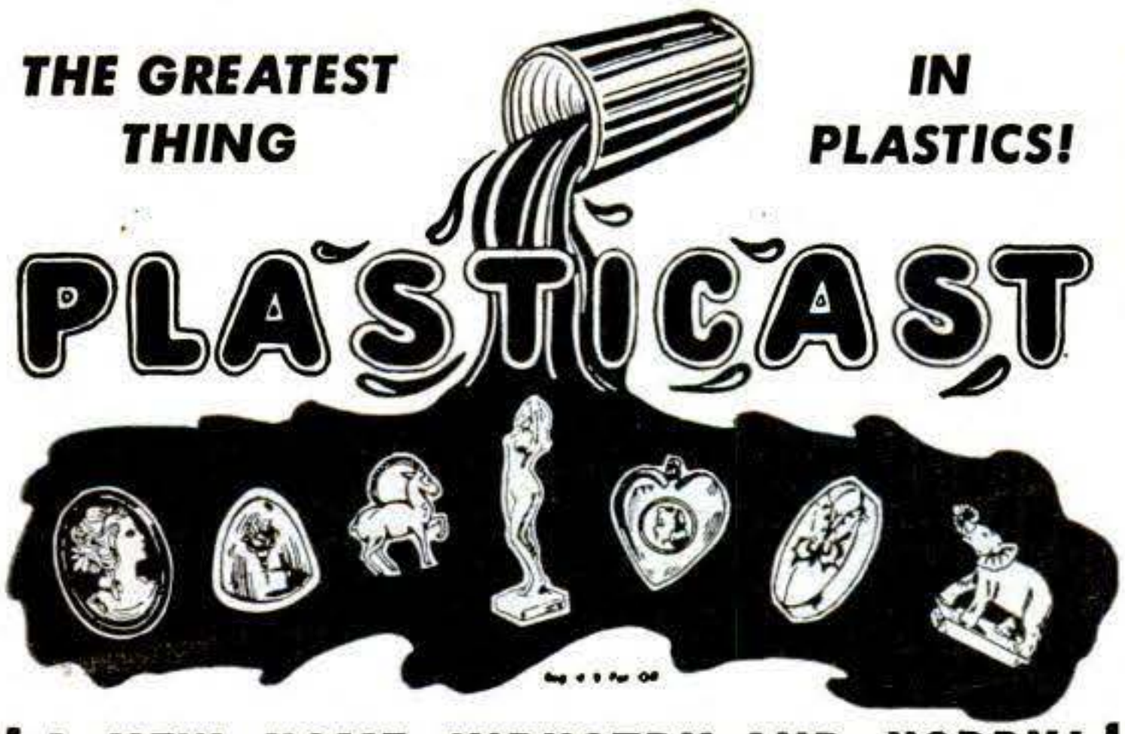
Address _____

City _____ **Zone** _____ **State** _____

Copyrighted material

THE GREATEST THING IN PLASTICS!

PLASTICAST



A NEW HOME INDUSTRY AND HOBBY!

PLASTICAST is a transparent liquid plastic; can be poured into ANY kind of mold or container. Hardens in a few minutes into a transparent solid, clear-as-glass, tough as steel plastic! No tools, machinery or skill required. IDEAL for imbedding pretty flowers, butterflies, photos, medals, souvenirs, biological specimens, etc. Makes a **PERMANENT** and **ATTRACTIVE** display. Make attractive jewelry, gems, lenses, knick-knacks, novelties Easily cast into sheets, rods, blocks, ANY color, ANY shape! **EVERYTHING** furnished including molds, for making about $50.00 worth of *unusual* novelties! **PLASTICAST OUTFIT, Complete with 3 molds.** Illustrated Instruction Manual included..... **$3.50**

Our Casting Plastics are as easy to use as pouring water out of a glass!

PLASTIDUR . . . (LIQUID IVORY). Ideal for casting all OPAQUE articles. Hardens in a few minutes into an extremely hard **IVORY**-like plastic! May be dyed any color or cast into any shape. Works in **EVERY** type of mold! Non-inflammable, waterproof. DURable. Ideal for statuary, novelties, figurines, toys, gadgets, tools, knobs, bases . . . *a million useful applications!* Outfit comes complete with molds, dyes, accessories, instructions, etc. for making about $100.00 worth of attractive jewelry, etc! **PLASTIDUR OUTFIT, Complete with 3 molds..... $5.00**

TERMS: We pay the postage (U.S.A.) if full cash accompanies your order. C.O.D. accepted (U.S.A. only) if $1.00 deposit is included for each item ordered. C.O.D. orders not postpaid.

FREE A very attractive novelty made with one of above plastics FREE with our BIG catalog! Catalog lists largest selection of **MOLD MAKING** and **CASTING** materials in the WORLD! Liquid Plastics, Liquid Ivory, Liquid Marble, Liquid Glass, Ceramics, Liquid Porcelain, Moulage, Latex, Multiplex, Etc. Also Shellcraft, Internal Carving, Plastics, Glazes, Jewelry Accessories, etc. Price of catalog only 10c U.S.A. (25c Canada).

DEALERS: WRITE FOR ATTRACTIVE WHOLESALE PRICE LISTS

PLASTICAST CO. (Dept. A)

4637 N. Kedzie Ave. Chicago 25, Illinois *Write to Nearest Address* **P. O. Box 987 Palo Alto, Calif.**

Canadian Customers, please order directly from: **Canadian Industrial Plastics, Ltd.,** 1056½ Pender West, Vancouver, B. C.

THOUSANDS BUILD

EASY TO ASSEMBLE KITS

START NOW!

NO EXPERIENCE NECESSARY
Everything Complete in Kit. Quality Material. Simple as ABC instructions. Immediate Delivery. Save Money, Big Value, Sturdy

ROWBOATS, KAYAKS, DINGHIES, INBOARDS, OUTBOARDS, RUNABOUTS, CABIN CRUISERS

SEND 25¢ (COIN) FOR CATALOGS

Colorful Illustrations show all '49 Models, 8 to 23 Ft., and Construction Details.

U-MAK-IT PRODUCTS
MARINE DIVISION
Formerly Kayak Boat Co.
703R-WHITTIER ST., N. Y. 59, N. Y.

3 NEW ATOMIC RACERS NOW READY

You have seen our reliable Adv. month after month **SO**

BEFORE BUYING ANY TIRE—CONSIDER YOUR FAMILY'S SAFETY—NOT JUST PRICE • BEST BRANDS, INCLUDING

GOODYEAR Firestone Goodrich U. S. ROYAL

SLIGHTLY WORN HIGH TREAD TIRES, NO RECAPS OR REBUILTS

Vets Take 10% Discount. You Certainly Deserve It

FREE BUTYL TUBE **14 MONTH GUAR. BOND**

600-16 $3.49	550-17 $5.95	600-20 $7.20	34x7 $9.65
650-16 $3.49	550-16 $4.65	700-20 $8.75	825-20 $11.50
650-15 $3.54	700-16 $5.50	32x6(8) $8.75	900-20 $11.65
700-15 $3.74	750-16 $6.75	32x6(10) $9.50	1000-20 $11.65

You've Never Seen Tires Like These Factory Adjusted "ALL-PURPOSE" CAR & TRUCK TIRES "TRIPLE-A" "TOP GRADE"

GOLDEN-RULE GUAR. 24 MOS. AGAINST ANYTHING!

600-16 $5.50	525-18 $6.75	600-20 $10.95	32x6(10) $12.50
650-16 5.50	550-17 8.00	650-20 11.50	825-20 15.45
650-15 5.50	700-16 7.50	700-20 11.95	900-20 15.45
700-15 6.50	750-16 8.50	32x6(8) 11.95	1000-20 16.45
600-16(6) 7.00	650-16(6) 7.00	750-20 11.00	34-7 13.00

We've Shipped Tires to Canada, Italy, Puerto Rico, Alaska
OUR TIRES USED ON SCHOOL BUSES AND AMBULANCES

750-20 MILITARY FITS 32x6 700-20
8-ply Top Grade (Were $9.75) $9 Guar. 12 Mos.
Premium Grade (Were $18) $13 Guar. 26 Mos.
900-16 "A" $8.75 900-16 "AA" $10.75

Send check or money order & this ad for rush shipment. We won't ship a tire that WE wouldn't use. 31 years "know-how" in our pinpoint triple inspection. Please depend on us.

BLATT LANCASTER TO GIRARD AVE., DEPT. P.S. Blatt Bldg. PHILADELPHIA 31, PA.

POCKET ALARM WATCH

RADIUM HANDS & DIAL, IMPORTED SWISS MVM'T.

Here's a Guaranteed accurate Time Piece that sounds off to your appointments, useful on week-ends. Vacations or to get you off to work on time. No bigger than an ordinary Pocket watch. Back opens to stand like a clock. Chrome Plated Case—Send only $1.00 with order, pay balance on arrival plus postage, or we pay postage if you enclose $13.95.

$13.95 POST PD. Incl. Fed. Tax

RICHARDS QUALITY PRODUCTS DEPT. S-1, P. O. BOX 139 NEW YORK 32, N. Y.

Free Book

RAISE HAMSTERS

The new wonder animals from Syria. Often called Toy Bears. Delightful pets. Everyone wants them. Laboratories need thousands. Clean, odorless. Raise anywhere. A profitable and interesting hobby or business. We furnish breeders and instructions. Write today for free book.

GULF HAMSTERY, 1540 BASIL ST., MOBILE, ALA.

KEY POSITIONS OPEN in Industry... NOW!

INSURE YOUR FUTURE

• Tool Making, Drafting, Design

Allied Training Certified & Approved by American Society of Tool Engineers. Endorsed by Industry. Approved For Veterans.

Train at **ALLIED'S BIG SHOPS**

ALLIED SCHOOL OF MECHANICAL TRADES, Inc. Write for FREE Catalog
445 Allied Bldg., 1338-40-42 So. Michigan Ave., Chicago 5, Ill.

NEWEST B-M POWER MOWER

For Modern Lawn Care

Low Factory Price • Fully Guaranteed • Some Dealerships Available

Newest addition to our family of fine power lawn mowers. Light, 3-wheel, rotary blade mower. Lifetime construction. Powerful 1½ h.p. 4-cycle engine. Self-propelled and other models available, including build-it-yourself Kit.

Model D-3

Write for Free Literature

B-M MOWER CO., Box 66-PS, Blue Mound, Kans.

Copyrighted material

SURPLUS BARGAINS

LARGE BLOWER UNITS

Single exhaust blower delivers approx. 420 cu. ft./min. at 1 oz. static pressure. **EXCELLENT** for furnace draft, or blowing system for removing sawdust, wood and plastic chips etc. American Blower Corp. Size "C", Type "P", impeller type fan; 3½" outlet, 6" intake; ½ H.P. motor (3450 rpm), 110V-A.C.-single phase. Like new (unused) Unit wt. 97 lbs. Govt. cost over $125..... **$49.50**

SMALL BLOWER UNIT

Ideal for darkrooms, trailers, kitchens; may also be used as hair dryers etc. Single exhaust with squirrel-cage type fan. 2½" intake, 2" outlet. Delivers approx. 55 cu. ft./min. 115V-A.C. (60 cycle) DELCO Motor. Simple to install for any use. Govt. cost $20.00. Like new (unused) **$9.95**

DELCO CARBON PILE GENERATOR VOLTAGE REGULATOR (24 Volt)

While they last . . . this hard to get item is being offered at a give-away price. No. 94-32276-A. Up to 200 amps. Slightly used.

ONLY $3.95

SPECIAL!!! This **10 lb.** choice assortment of aircraft **NUTS** and **BOLTS**—for the handyman or hobbyist. **10 lb. Package**..... **$1.95**

HIGH PRESSURE TANK

Carries up to 1800 lbs. pressure. Tank measures 19½" high by 6¾" wide with rounded ends. Solid metal construction fitted with brass release valve at top. Normally used for Co2. Excellent for use as oxygen storage tank or compressed air auxiliary tank. Slightly used **$5.95**

CLIMBING EQUIPMENT

SAFETY BELT
Good Leather Used..... **$2.95**

POLE CLIMBERS
and straps Used, good **$1.95** Pair

Send 25% with Order, Balance C.O.D. All Equipment F.O.B. Pasadena. Write TODAY for Catalog!

C. & H. SALES COMPANY

DEPT. S-5 • 1850 E. Colorado St. • Pasadena 8, California

BUILD OR BUY A LAWN SWEEPER

No tiresome raking. The quick and easy way for cleaning your lawn. Picks up leaves, grass, acorns, sticks, and combs the grass. Easily built from available parts. Mail 35c for complete plan telling you how. Catalog listing parts, and factory built sweeper, sent free with plan. **LEJAY MFG. CO., 123 LeJay Buildg., Minneapolis 8, Minn.**

BUILD ARC WELDER FROM OLD GENERATOR

For Light or Heavy Work. 75-200 amps. No previous experience needed. Complete **PLANS** and valuable Catalog 35c.

LEJAY MANUFACTURING CO.
1323 LeJay Bldg., Minneapolis 8, Minn.

SAVE $$ DOLLARS $$ ON
Nationally Famous
OIL FILTER REPLACEMENT CARTRIDGES

6 FOR $5.00 Post Paid

*** FITS MOST POPULAR CARS**
Fords, Mercury and Lincoln 1940 to 1949. Fits all Fram F-4 filters. (Replaces Fram C-4 cartridges.) Fits all General Motors cars equipped with A.C. Filters, type S-6.

*** WORLD'S LARGEST MANUFACTURER**
They are all brand new PUROLATOR filter elements, type N-51.

*** SAVE MONEY—SAVE YOUR MOTOR**
Buy now at LESS THAN WHOLESALE cost. Save nearly 50%. All brand new, can type with metal top and bottom, perforated composition sides, cotton waste filled.

*** SOLD ON MONEY BACK GUARANTEE**

*** 6 for $5.00—all shipping charges prepaid**

Dealer Inquiries Invited

H. B. MILBURN CO.

11861 So. Main St. • Los Angeles 3, Calif.

Finer Trailer Living

Greater comfort with exclusive new "Heat Saver" . . . Finer interiors . . . Outstanding quality produced by *exclusive* machine methods . . . Three year warranty . . . Yet, Schult costs no more than an *ordinary* trailer.

Write FOR FREE BOOK

Describes *exclusive* "Heat Saver," the greatest contribution to trailer living in years . . . details of kitchens, closets, bedrooms and floor plans of newly styled, moderately-priced, easy-trailing Schult models.

SCHULT CORP., Dept. 3105 Elkhart, Ind.
In Canada: John Inglis Co., Ltd., Toronto

SCHULT *Trailer Coaches*

Member T.C.M.A.

SHARPEN CIRCULAR SAWS LIKE AN EXPERT

$6.95

Precision file circular saws in your own workshop. No experience necessary. Adjustable to any pitch or angle. Gets hollow-ground, cross-cut or combination saw blades true and sharp. Fits 6" to 12" blades with ½, ⅝, ¾ or 13/16" centers. Complete with file, instructions, 4 different size mandrels. **Money Back Guarantee.** $6.95 postpaid—check or money order. $1 dep. on C.O.D.'s. Profit maker for fix-it shops. FREE ILLUSTRATED FOLDER! Order Today! Hardware dealers—send for prices.

SURE-SHARP MFG. CO., Dept. S-59, PO. Box 24, Santa Ana, Calif.

THIS LIGHT "Stays Put"

Hang it, set it down, carry it — brilliant beam hits the spot you choose. 80-100 hours of light on 6-volt battery. At hdwe., sport or electric stores. Price, less battery. **$3.25**

Delta REDDY*lite* ELECTRIC LANTERN

DELTA ELECTRIC COMPANY, MARION, INDIANA

Copyrighted material

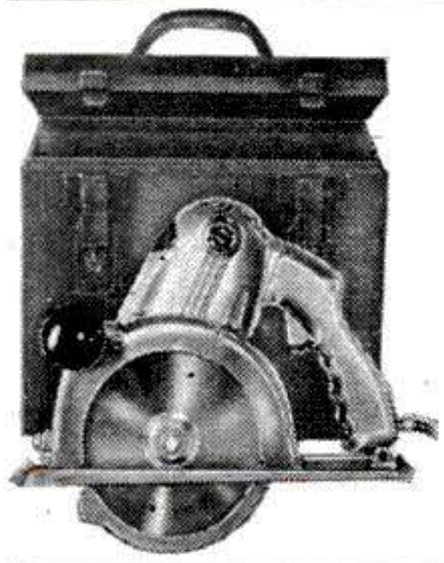
HARDWARE

SURPLUS

SALES CO.

FAMOUS BRAND PORTABLE POWER TOOLS FOR THE HOME SHOP, FARM, BUILDER AND FACTORY

We are moving these tools out at below established factory prices so we cannot mention brand name. All tools have amazing perpetual lifetime guarantee.



6" PORTABLE HAND SAW

A perfectly balanced saw with positive visibility. See where you are cutting!! An internal blower clears the sawdust from the work. The 11 lbs. weight of the saw is balanced over the work so that sawing is easy without undue strain on the wrist. Ideal for cutting, ripping lumber and 2 x 4's.

CHECK THESE FEATURES

- 6" combination blade, 1⅞" depth cut
- Alloy steel worm, Navy bronze gear
- Base adjustable for depth of cut
- Internal blower clears sawdust & cools motor
- Automatic safety guard
- Anti-friction ball & roller bearings
- Heavy gauge steel carrying case
- Lifetime factory guarantee
- 110-115 volt AC-DC motor

Shpg. wt. 20 lbs.
Complete price **$52.50**

¼" DRILL

A rugged shop drill with a full handle grip. The RPM regulates to the load preventing the drill from stalling.

CHECK THESE FEATURES

- Rugged cast aluminum
- Motor will not stall
- ¼" 3 jaw "Jacobs" geared chuck with key
- Sealed & lubricated reduction gears & thrust bearing
- Built in cooling fan
- 2200 RPM at no load, 115 volt AC-DC
- Lifetime guarantee

Shpg. wt. 6 lbs.
Complete Price **$17.50**

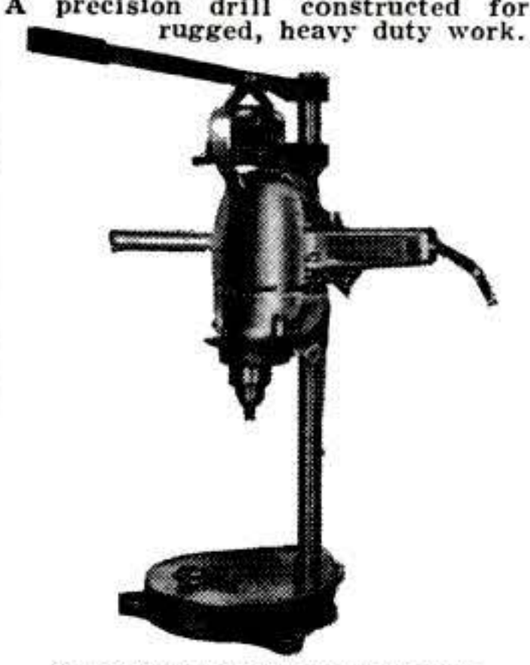
¼" DRILL STAND converts drill into handy drill press.
Complete as shown..... **$8.95**

Prepaid orders sent postpaid. 10% deposit req. on C. O. D. orders.

HARDWARE SURPLUS SALES CO.
300 W. 51 St., N.Y.C., N.Y.

½" HEAVY DUTY DRILL

A precision drill constructed for rugged, heavy duty work.



CHECK THESE FEATURES

- Sturdy cast aluminum housing
- ½" 3 jaw "Jacobs" geared chuck with key
- Specially heat treated reduction gears & thrust bearing
- Sealed gear case fully lubricated for years of trouble free service
- Built in cooling fan
- Anti-friction ball, roller and "Oilite" bearings
- 550 RPM, 115 volt AC-DC motor
- Lifetime guarantee

Shpg. wt. 11 lbs.
COMPLETE PRICE **$32.75**

½" DRILL STAND converts into handy drill press. Complete stand as shown.
Shpg. wt. 26 lbs..... **$13.95**

E-Z CAR WASHER

SOAPS, WASHES and RINSES

Can also be used to wash Windows, Walls, Boats, Porches, Cellars, Garage Floors and many other uses.

in one operation

Easily attached to garden hose —4 ft. aluminum handle
Built-in soap pouch • Replaceable mop
Cars can be washed easily without getting yourself wet

ORDER NOW!
Send $3.25 check or money order. We deliver postpaid. Money back if not entirely satisfied.

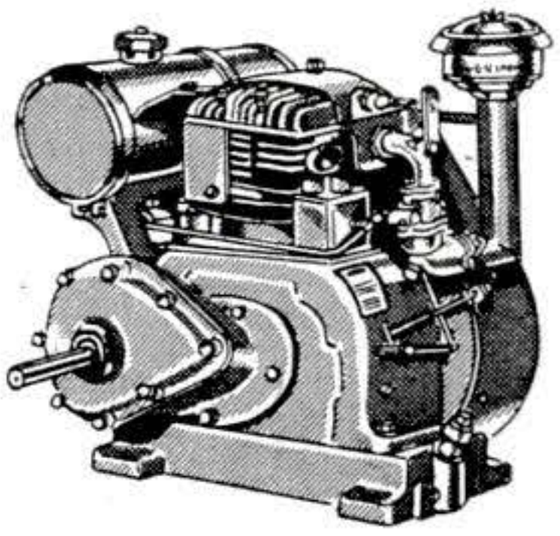
$3.50 POSTPAID

E-Z CAR WASHER

401 West 48th St., Dept. P.S. 2, New York 19

NEW GAS ENGINES

6.5 HP BRIGGS & STRATTON GAS ENGINES



Model ZZR-6. 4 cycle, single cylinder air cooled. Develops 6.5 HP at 533 RPM. Adjustable governor and built in 6 to 1 reduction gear. New in original crate. **List price $165.00**

OUR PRICE f.o.b. Milwaukee **$97.50**

ORDER TODAY—LIMITED QUANTITY AVAILABLE

SEND MONEY ORDER OR CERTIFIED CHECK

J. J. TRUNDE

1937 N. Hubbard **Milwaukee 12, Wisconsin**

Weed Spray Pumps

Build your own power sprayer. Bronze gear type. 0-150 lb. pressure. Pumps to 90 gal. per hr. @ 100 lb. with ¼ hp Pump Head only $10.95. With built-in pressure regulator $15.45. Other sizes and types available. 15c for valuable pamphlet on construction and operation of Boom sprayers with parts lists and prices of Nozzles, hose, fittings, gauges, valves, etc. Free with pump order. New 1949 52-page Bargain Catalog 10c.

MIDWEST SALES CO.

2533 Indiana **Dept. PS5** **Kansas City, Mo.**

Chronograph Wrist Watch

LOWEST MARKET PRICE $6.90

Sweep Second Hand; Precision Workmanship; Rugged Shock-resistant case; Radium hands and numerals; Leather strap. It measures distance, speed of cars, planes, horses and other moving objects. It's a time keeper, stop watch, telemeter, tachometer. One year written guarantee and full operating instructions enclosed with each watch. SEND NO MONEY. Mail your order today. Pay postman $6.90 plus 10% Federal tax. Total $7.59 plus postage. Or send cash (money order or check) with your order and save postage charge.

MARDO SALES CO.

Dept. PS, 480 Lexington Ave., New York 17, N. Y.

ZECOL COOLING SYSTEM CONDITIONER

EASY TO USE

No draining or flushing. Clean up rusty water while you drive! Rust and corrosion inhibitor. Lubricate water pump bearings and seals!

At Garages and Service Stations

ZECOL INC.
Milwaukee 1, Wis.

Copyrighted material

GET INTO DRAFTING

The Draftsman Plays a most Important Part in INDUSTRY

DRAWING OUTFIT INCLUDED

with Drafting courses.

All the tools you need including folding drawing table. With them you can put your ideas on paper quickly and with accuracy. With training you are all set to master Drafting in months, —not years—at home.

Learn in Spare Time—At Home!

(or at the College in Chicago)

A few hours of pleasant home study every week—that's all. With Chicago Tech's help, you train yourself step by step. This tested method—developed over 44 years of C.T.C. progress —prepares men for good positions in industry.

Practically everything that's built or manufactured these days is constructed from blue print drawings prepared by the draftsman. He is the KEY man in industry. No new machines can be built, no bridges erected, no buildings constructed until the draftsman has completed his work.

Drafting is clean, interesting, professional-type work. The draftsman is paid well to start. And he has real opportunities for advancement to high-pay jobs in Engineering. The tremendous production programs ahead in industry will require more draftsmen than ever before.

Send today for free information. See what this training has done for others, what it can do for you. Simply MAIL COUPON TODAY in an envelope or use a penny postcard.

MAIL COUPON NOW

CHICAGO TECHNICAL COLLEGE
E-226 Tech Bldg., 2000 So. Michigan Ave., Chicago 16, Ill.
Mail me FREE Drafting Lesson with information about big opportunities in DRAFTING and how I can train at home.

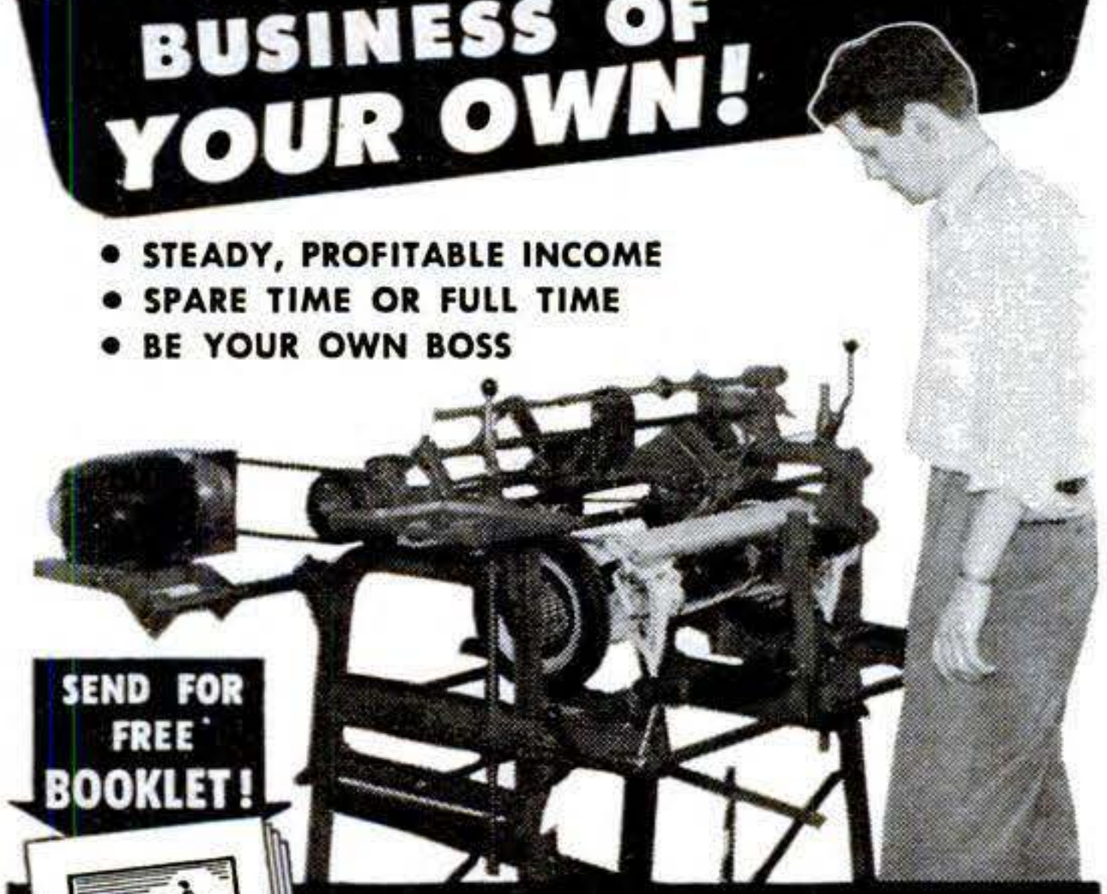
☐ Architectural Drafting ☐ Electrical Drafting
☐ Machine Drafting ☐ Structural Drafting
☐ Builders' Course

Name..... Age.....
Address.....
City..... Zone... State.....

CHICAGO TECHNICAL COLLEGE
E-226 Tech Building, 2000 South Michigan Ave.
Chicago 16, Illinois

BUILD A PERMANENT BUSINESS OF YOUR OWN!

- STEADY, PROFITABLE INCOME
- SPARE TIME OR FULL TIME
- BE YOUR OWN BOSS



SEND FOR FREE BOOKLET!

SHARPEN LAWNMOWERS ON THE **IDEAL SHARPENER**

Part time or full time—make up to $5.00 an hour. No experience necessary. Hundreds of mowers in your neighborhood need sharpening. Get started now and get the only sharpener that grinds each reel blade to fit the bed knife. Send for free booklet today.

THE FATE-ROOT-HEATH CO.
Dept. D-4, Plymouth, Ohio

SURPLUS BARGAINS

ASSEMBLE YOUR OWN BINOCULARS!

Complete Optics! Complete Metal Parts!
WE SUPPLY FULL INSTRUCTIONS

GOVERNMENT'S 7x50 BINOCULARS

Save More Than ½ Regular Cost

METAL PARTS—Set includes all Metal Parts—completely finished —for assembly of 7 X 50 Binoculars. No machining required. A sturdy Binocular Carrying Case is optional with each set of Metal Parts.

Stock #842-N **$39.40**
Postpaid, plus $4.80 for Case.
Total **$44.20**

OPTICS—Set includes all Lenses and Prisms you need for assembling 7 X 50 Binoculars. These are in excellent condition—perfect or near-perfect—and have new low reflection coating.
Stock #5102-N ..... **$25.00 Postpaid**
(These are standard American-made parts . . . not Japanese, French or German.)

NOTICE! If you buy both Binocular Optics and Binocular Metal Parts, add 20% Federal Excise Tax to above prices.

ARMY'S 6x30 BINOCULARS—We have complete Optics and Metal Parts. Write for Catalog N.

SLIDE PROJECTOR SETS—Consist of all unmounted lenses you need to make the following size projectors:
Stock #4038-N—2¼"x2¼" ..... **$3.35 Postpaid**
Stock #4039-N—2½"x3½" ..... **$3.35 Postpaid**
Stock #4029-N—35 mm. ..... **$2.85 Postpaid**

MOUNTED ANASTIGMAT LENSES—Use for Projectors, Enlargers, Copying Cameras. Complete with Shutter and Diaphragm. Value about $20. An excellent buy. WE WILL INCLUDE FREE ILLUSTRATED BOOKLET on HOW TO MAKE YOUR OWN ENLARGER.
Stock #8004-N—Speed f/7.7, focal length approx. 127 mms. Suitable for pictures, negatives, positives up to 3½"x4¼" ..... **$7.50 Postpaid**
Stock #8006-N—Speed of f/7.7, focal length approx 100 mms. Suitable for pictures, etc. up to 2¼"x3¼" **$8.50 Postpaid**
Stock #8007-N—Speed of f/6.3, focal length approx. 100 mms. ..... **$9.50 Postpaid**

Order by Stock No. ***Satisfaction Guaranteed***

Edmund Salvage Company P. O. AUDUBON, NEW JERSEY

Copyrighted material

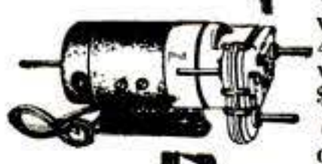
WAR SURPLUS BARGAINS

● **POWER PLANTS.** 110-volt, 60 cycle, 3,000 watt. Remote switch electric self-starter. Fine instrument control panel. Army's finest plants. Full maintenance-operation instructions. Ideal for farmers, sportsmen, contractors. New condition. Cost Gov't. $756. **Sale price—$345.00.** Also lower priced plants. Freight prepaid. (Write for details).

● **MARINE ENGINES.** New single cylinder Briggs U.S. Falcon. 3.5 h.p. air cooled, flame arrestor, thrust bearing, shaft coupler. Ideal for fishing boats. Also excellent for farm or industrial uses. Used for garden tractors, weed sprayers, elevators, pumps, scooters, saws, etc. Complete instructions. Standard price $130.00. Prepaid price **only $89.90.** Same engine with Utility Clutch **$99.90**

● **BRIGGS 6.5 H.P. ENGINE.** Model ZZ. Nearly new & excellent. Useful tractors, grain elevators, weed & paint sprayers, pumps, scooters, saws. Cost $130. Our freight paid price **$86.90**

● **PRESSURE AIR UNIT AND SPRAYER.** Portable wheeled Briggs-N 1½ h.p. engine driven unit. Bendix 2-cylinder compressor. Gauge, regulator, valves, hose—complete. Excellent for painting, weed or insect spraying, tire pumping, cleaning and greasing equipment, etc. Hundreds uses—our most popular item! Cost $259. **Special Freight Prepaid** **$99.50**



● **A-C MOTORS.** New 110-volt, 60-cycle, with marvelous speed reduction gear. Speeds of 8, 32, 320 & 4000 r.p.m. on four shafts. Useful grinders, drills, coil winders, photo room, window displays. Cost over $30.00. Prepaid price **$8.75**

● **ROTARY GEAR PUMPS.** Precision unit. New condition. High vacuum and pressure. Dozens of pumping uses on farm and in business—also pumps high vacuum. Full instructions. Cost $36.50. Prepaid price . . **$3.95**

MISCELLANEOUS BARGAIN ITEMS

● **Mighty-Midget Motor** (Wt. 7 oz.) G. E. 110-v, 60-c, geared down to 150 R.P.M. Amazing power. Powerful pocket size grinder, drill. Cost over $23.00 ..... **Price $5.95**

● **Clutch.** For engines or motors. (Max cap. 6.5 h.p.) . . . . **Price $13.95**

● **Selsyns.** G.E. Precision Small Size. Fine for 110-v, 60-c. **Per Pair $3.39**

● **Telephone Intercom. System.** Two station. Either wall or desk instruments. Selective call. Cost over $65.00 ..... **Price $8.98** (extra stations $4.49 each)

● **Burglar-Fire Alarm Unit** (Parts cost over $19.) ..... **Price $5.90**

● **Eavesdropping Unit.** Selective station type. (Ultra-sensitive) **Price $6.70**

● **Telephones.** Desk or wall with ringer. Cost $25.00 ..... **Price $4.99**

Other values include vacuum and electronic tubes photo cells, Wheatstone bridges, test instruments, etc. Card brings complete catalog. Write for Details on 250-Ampere D-C Welder. A 4-Star Outstanding Bargain.

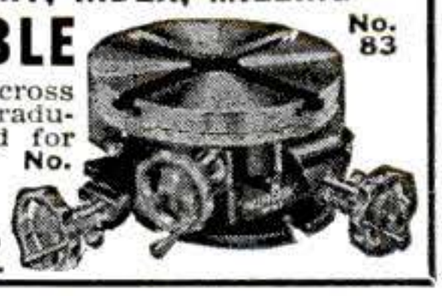
● **Vacuum Pumps,** (high capacity). Many uses. Cost over $30.00. **Price $5.60**

We pay freight or postage all items. We accept personal checks. Order direct from ad or write for bargain cat. Our references—17 years' business in Lincoln and the Nat'l Bank of Com.

LECO ENGINEERING CO., Box 908 PS-18, Lincoln, Nebr.

DUAL CROSS and ROTARY FEED

PALMGREN ROTARY, INDEX, MILLING TABLE No. 83



Has 8" table, 360° movement and 4" cross feed travel. Adjusting wheels and dials graduated in degrees and thousands. Slotted for bolting to table. **No. 83** Priced **$49.50. No. 82** without rotary feed **$39.75.**

Write for Circular No. 10

CHICAGO TOOL and ENGINEERING CO.
8396 South Chicago Ave., Chicago 17, Ill.

FREE GET YOUR COPY OF THIS AMAZING FOLDER TODAY

REVEALS HOW TO MAKE BIG MONEY

CASTING NOVELTIES FOR MONEY To

IN A BUSINESS OF YOUR OWN

No Experience or Special Education needed.
Tells All about the Miracle New FLOC-RITE the material with 1001 uses. Send for this FREE folder today.

BING PRODUCTS, 88 Broad St., Boston, Mass.

MAIL THIS COUPON for FREE FOLDER

Bing Products, Inc., Dept. PS-5J, 88 Broad St., Boston, Mass.
Gentlemen: Please, rush me the FREE folder that tells All about this Big money-making business.

Name _____

Address _____

City _____ Zone _____ State _____

FALSE TEETH FIT TIGHT

FOR LIFE OF PLATE
With One Application
or YOUR MONEY BACK
Professionally Developed
Amazing

LINO-DENT

REAL COMFORT INSTANTLY FOR ALL PLATE WEARERS . . . No fuss or bother—looseness and slipping vanish—gum soreness heals and disappears—forever.

Not Messy—Not Sticky

Not a paste or powder but an amazing development in field of plastics. The same material modern dentures are made of. That's why we can guarantee perfect plate comfort permanently with one application.

Absolutely Safe, Pure, non-toxic, non-irritating, harmless, odorless, tasteless, pleasant. Needs no heat. Easy to use!

Money back guarantee

SEND NO MONEY—Full size package only $1.25 plus postage. Specify upper or lower. Both $2.25 plus postage C.O.D. Enclose payment and save postage.

LINO-DENT, Inc. (Dept. A6), 1199 BROADWAY NEW YORK 1, N. Y.

NOW YOU TOO CAN BUILD 15 RADIOS

COMPLETE KIT $14.75

Absolutely no Knowledge of Radio Necessary
You Need NO Additional Parts

The PROGRESSIVE RADIO KIT is THE ONLY COMPLETE KIT. Contains everything you need. Instruction Book, Metal Chassis, Tubes, Condensers, Resistors and all Radio parts.

The 36-Page Book written by Expert Radio Instructors teaches you to build radios in a Professional Manner. You start with a 1-tube receiver. Before you are done with this kit, you will have built 11 Receivers, 1 Public Address System and 3 Transmitters.

SPECIAL FREE OFFER!

Electrical and Radio Tester sent absolutely FREE with each Progressive Radio Kit, PLUS FREE membership in Progressive Radio Club. Entitles you to free expert advice and consultation service with licensed radio technicians.

Write for further information, or ORDER your KIT NOW! ONLY **$14.75**

Postage prepaid with check or money order.
(Postage not prepaid with C.O.D. orders)

PROGRESSIVE ELECTRONICS CO., Dept. 108
497 Union Avenue Brooklyn 11, N. Y.

HANDBOOK OF AIRPLANE MAINTENANCE & OPERATION

Easy self-study course and up-to-date reference manual in one low-priced book! Covers basic principles and functions, construction, repair and maintenance of *every* part of the modern airplane. 512 pages, 600 pictures, over 300,000 words! 2,500-item index! Specification data sheets of world's leading types of aircraft. Only $5.00—refunded if not fully satisfied after week's trial.

NATIONAL AERONAUTICS COUNCIL, Inc., Dept. 805
37 West 47th Street New York 19, N. Y.

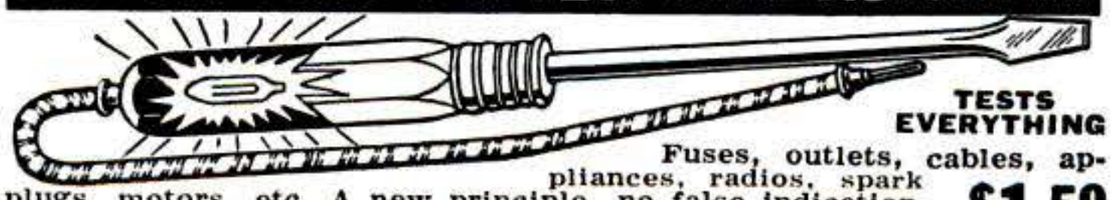
JIFFY CAR WASH AT HOME WITH AIR FLOW AUTO MOP

Washes with suds—rinses with clear water—drys without streaks! Fill FOAM RUBBER mop head with detergent soap like Vel or Tide, attach hose, regulate water to flow SLOWLY and wash car. Then rinse with clear water. It's quick—it's easy—it's economical!

NEWHOUSE CO. 1125 E. Colorado Glendale, Calif.

$2.49 Post Paid Check or Money Order

ALL CIRCUIT TESTER SCREWDRIVER



TESTS EVERYTHING

Fuses, outlets, cables, appliances, radios, spark plugs, motors, etc. A new principle, no false indication. Neon test lamp in handle, lights on 105V to 550V, AC or DC, won't light on capacity and leakage. 7¾" long. Shockproof handle, ground blade. **Lead wire is removable.**

$1.59 Postpaid

WORLD SPECIALTIES CO. 100 Chamber of Commerce Bldg. PASSAIC, N. J.

Copyrighted material

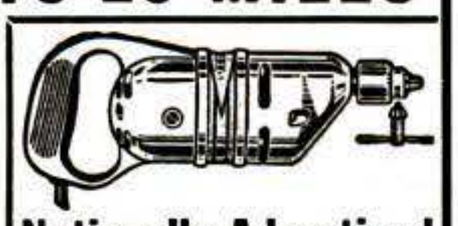
SENSATIONAL! NEW!

No Batteries—No Power Supply

TALK UP TO 25 MILES

our price **$9.95**

High fidelity speech transmission. Ideal for emergency or convenience applications. Operates up to 25 miles with #16 twisted wire; up to 15 miles with #19. And no auxiliary power needed. Also operates over single wire with ground return. As many as 12 handsets can be operated in communication systems for group conversations. Explosion proof. No fire hazard. No spark is generated. Guaranteed one year by Wheeler Insulated Wire Co. (Div. of Sperry Co.) Shipping weight 3 pounds. Immediate delivery. (Add 30c postage to above price.)



Nationally Advertised
Powerful 1/4"
ELECTRIC DRILL

A new high in value and precision, a new low in price — because of Cummins Low Factory Overhead Policy. Full-sized, superbly balanced, permits finger tip control in all positions. Built to micro inches, performs equally with higher priced drills on metal, plastic or wood precision and production drilling. Perpetual Factory Guarantee. Model 110, with Jacobs Hex Key Chuck $18.95. Model 130, with Jacobs Geared Chuck $20.95 (add 80c postage to above prices.)

18 PC. SOCKET WRENCH SET

1/2" and 1/4" HEX DRIVE. Complete range of 14 socket wrenches. 3/16"-15/16". Two offset handles. Ratchet wrench and plug adapter. Bright plated tools in heavy metal case..... **$2.95**
(Add 30c postage to above price.)

ARMY Haversack

Only $2.00 Post-Paid

Scientifically designed to carry food, mess kit, blanket, hunting, fishing, camping or trapping gear without additional equipment. Takes the fuss out of picnics too. Convenient for mechanics and transporting light equipment. Full illustrated instructions show how to use Non-rust hardware.

Order by mail. Send for bargain lists on camping & sports equipment, clothing, radio, tool, gas engine generators. Satisfaction Guaranteed.

ABELL DISTRIBUTING CO.
Dept. PS 5
4633 York Rd., Baltimore 12, Md.

RE-STRING RACKETS AT HOME—EARN MONEY

FREE
Write for our Catalog and instruction Sheet.

It's pleasant, profitable work. No experience or skill required. Easy to learn. Full line of guaranteed **Stringing Tools, Frames, Gut and Silk Strings.** Every item high quality.

W. A. BICKEL & CO., 803 So. Boulevard PS-5, Oak Park, Ill.

NOW AVAILABLE!

P-B

The Gas Powered Scale Model Racing Car that Broke the World's Record is now in Full Production

WRITE FOR FREE INFORMATION—TODAY!

MODEL INDUSTRIES, INC., DEPT. 95-S
63 FOREST VIEW DRIVE, SAN FRANCISCO 16. CALIF.
DEALER'S INQUIRIES INVITED

LEARN WATCH & CLOCK REPAIRING AT HOME WITH OUR *Enlarged* SELF-TRAINING KIT

Start **NOW in this uncrowded field! EASY to learn!** Earn while you learn! **Even as a sideline you can make $50 and up each week.—OUR PRACTICAL SELF-TRAINING KIT** is all you need, **contains: REAL PROFESSIONAL TOOLS (Loupe, 3-4 power; Complete Set of 6 Special Watch Screw Drivers; Clock Screw Driver with reversible blade; Tweezer AA; Special Clock Tweezer; Plastic Material Tray; Case Opener & Knife; Movement Gauge;** *and* **2 COMPLETE BOOKS on Modern Watch Repairing,** also **Clock Repairing and Making.** Fully illustrated. Easy to understand. Shows every step in repair and use of tools. **Only $9.85 Post Paid**

(If C.O.D., plus charges.) Money Back Guarantee
If ordered separately: Each book $2.65; Set of tools $5.35

MODERN TECHNICAL SUPPLY CO.
Dept. 3MPS. 55 W. 42nd Street, New York 18, N. Y.

NEW COMPLETE CATALOG on all Modern Precision Tools, Materials & Books with descriptions & over 600 ILLUSTRATIONS for Watch-Clockmaking, Jewelry, Tool-Instrument Making. USEFUL FOR YEARS because catalog entitles you to future Free supplements.
Catalog FREE with KIT or 50c credited to 1st order

WHAT MAKES IT WORK?

BECKER
Spray-Gat

NEEDS NO COMPRESSOR AIR HOSE MOTOR ELECTRICITY

TAKE IT ANYWHERE FOR

- Painting—Varnishing
- Mothproofing
- Disinfecting
- Fireproofing
- Exterminating
- Rustproofing
- Humidifying
- Insecticiding
- Oiling

ONLY $18.50

● Here—at last—is a completely *portable* spray gun. Becker **Spray-Gat** goes where you need it . . . simple to use as a flashlight. It's lightweight . . . self-contained . . . no bulky, expensive attachments or "extras". Pressure supplied by easy-to-load, inexpensive CO2 cartridge. Use **Spray-Gat** for all sorts of spraying and painting jobs in the home, workshop, garden and garage. Comes complete with 3 cartridges.

SATISFACTION GUARANTEED. See the amazing **Spray-Gat** at your dealer. If he cannot supply, order direct. We ship postpaid if you send $18.50 (check, draft, money order). Or send only $2.00 now and pay postman balance plus postage. Extra CO2 cartridges, 10 for $1.00.

SULLIVAN-BECKER CO. Dept. 129-E Kenosha, Wis.

USE COUPON TO ORDER

SULLIVAN-BECKER CO.,
Dept. 129-E, Kenosha, Wisconsin

....Enclosed find $18.50. Ship **Spray-Gat** postpaid.
....I am enclosing $2.00. Send **Spray-Gat** C.O.D.—I'll pay postman balance of $16.50 plus postage.

NAME.....

ADDRESS.....

CITY.....ZONE....STATE.....

High School at Home

Many Finish in 2 Years

No classes. No time wasted going to and from school. Progress as fast as your time and abilities permit. Standard H. S. texts supplied. Thousands enroll each year in this 52-year-old school. Send for FREE descriptive booklet.

AMERICAN SCHOOL, Dept. H546
Drexel at 58th St., Chicago 37, Ill.
Without obligation, please send FREE descriptive booklet.

Name.....

Address.....

Copyrighted material

HARD OF HEARING

You've Waited for This!

HERE IT IS!

NO RECEIVER BUTTON IN THE EAR!

• The Phantomold combined with the Beltone Hearing Aid assures you of unsurpassed hearing quality for both tone and volume. But best of all, even your friends won't notice that you are wearing a hearing aid. You owe it to yourself to see this newest hearing improvement and convince yourself that now for the first time you really can conceal your deafness.

Guaranteed by Good Housekeeping — Replacement or Refund of Money if not as advertised therein

Beltone

MONO-PAC

ONE-UNIT HEARING AID

Beltone Hearing Aid Company, Dept. POS-5
1450 West 19th St., Chicago 8, Ill.

Beltone Hearing Aid Co., Dept. POS-5
1450 West 19th St., Chicago 8, Ill.

Please tell me more about the new invisible PHANTOMOLD.

Name.....

Address.....

Town..... State.....

How One Tube of Tip-Top Solder Stopped the Leak in a 5,680 Gallon Gasoline Tank!

"About a year ago with one tube of Tip-Top Liquid Solder, I stopped a small leak in a 5,680 gallon galvanized storage gasoline tank. You can guess what this would have cost to fix with a welding torch."

Mr. R. H. E., Minnesota

TIP-TOP Liquid Solder saves you big money on repair bills. Forms a perfect joint in metals, wood, leather, paper, glass, china—most any material. Water and gasoline proof—exceptional adhesive properties.

Always keep a tube handy on work bench, in kitchen, in car. Get TIP-TOP at your hardware dealer today or write TIP-TOP PRODUCTS, OMAHA. Always insist on TIP-TOP—the original and superior Liquid Solder.

"VETS" TAKE 10% DISCOUNT
OUR GUARANTEE
OUR TIRES must make good or WE WILL
NEEDLESS TO PAY MORE
RISKY TO PAY LESS
OUR LONG EXPERIENCE INSURES YOUR SAFETY
You get what we advertise
Highest Quality Lowest Prices

HIGH ORIGINAL TREADS — Slightly Used

BUY IN CONFIDENCE safe dependable selected POPULAR BRANDS—Guaranteed to give A-1 SERVICE. Do not confuse these tires with re-caps or re-treads.

SELECTED for TOUGHEST JOBS Not just good . . THE BEST
These are genuine Values! One Trial will CONVINCE YOU

TOPS IN VALUE		TOPS IN SAFETY			
600-16	$5.32	650-16	5.32	700-16	6.32
650-15	5.02	700-15	$5.32	750-16	7.92

World's Best Truck Tire Values Top Service Minimum Prices

600-20(6)	$8.72	750-20(10)	12.22	1100-20(12)	16.42
650-20(6)	8.72	825-20(10)	14.92	1100-22(12)	18.22
700-20(8)	10.32	900-20(10)	15.42	32x6(8)	9.82
750-20(8)	9.22	1000-20(12)	16.22	32x6(10)	12.[illegible]

750-20 MILITARY 8 PLY REGULAR $8.62—SUPER $11.92
900-16 MILITARY 8 PLY REGULAR $7.22—SUPER $9.22
ONE QUALITY THE BEST AVAILABLE

HERE'S MAXIMUM QUALITY IN THESE O. K. SAFE TIRES

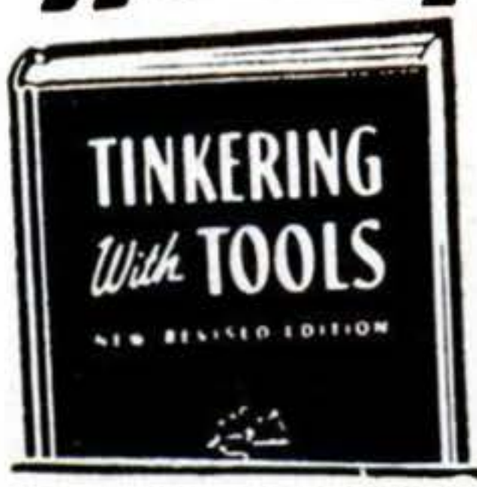
600-16	$3.62	650-16	$3.92	700-16	$4.62
650-15	3.92	700-15	4.02	750-16	5.92
600-20(6)	$8.02	750-20(10)	$9.22	1100-20(12	13.92
650-20(6)	7.72	825-20(10)	11.22	1100-22(12	16.92
700-20(8)	9.32	900-20(10)	11.92	32x6(8)	9.22
750-20(8)	8.22	1000-20(12)	12.92	32x6(10)	11.22

OUR SPECIALTY—TIRES FOR SCHOOL BUSES AND AMBULANCES

Thousands of Tires Shipped to Satisfied Customers Through-out United States and Many Distant Points. Please Note: We've made Thousands of Friends by giving a Tube with Passenger and Truck Tires. MAIL ORDERS given Personal Attention — Send This Ad with Check or Money Order. Dept. 5

STANDARD 834 N. Broad St., Phila. 30, Pa.

HOW TO SAVE MONEY ON *Home Repairs!*



NEW BOOK MAKES IT EASY!

Only $1.49

NOW you can save up to 50% on household repairs if you follow simple instructions in the big new illustrated book, *Tinkering With Tools!* Here you'll find everything you need to know about woodworking, shingling, plastering, interior and exterior painting, plumbing, wiring and masonry! In a jiffy you can learn how to repair faucets, valves and traps, electrical appliances, how to refinish floors and furniture, lay sidewalks, panel walls, renew sash cords, stipple walls—hundreds of home repairs so easy to make!

Never before have so many money-saving helps—plus hundreds of pictures—been packed into one big 260-page cloth-bound DeLuxe volume to sell for ONLY $1.49! A book this big should cost $3.50 or more!

SEND NO MONEY—ORDER TODAY

Mail your order now, and pay postman on delivery ONLY $1.49 plus shipping cost. If after 7 days' FREE TRIAL you aren't completely satisfied, return book and we'll gladly refund every cent. Write to:

POPULAR SCIENCE, Dept. 68
353 Fourth Avenue, New York 10, N. Y.

Copyrighted material

LET ME PUT YOU IN A BIG PAY BUSINESS OF YOUR OWN!

AT HOME—FULL OR SPARE TIME

METALLIZED BABY SHOES IN REAL METAL • BRONZE • GOLD • SILVER • PEARL AND GLASS

Let JOHN KIKTAVI give you the benefit of his years of experience in this fine field.

$5.00 PER HOUR IS EASY

Metallized baby shoes offer you the chance of a lifetime to be independent. The chance to be your own boss. Make up to $5.00 per hour FOR YOUR SPARE TIME. Yes — you can easily average $5.00 an hour and more working only spare time — think what this can amount to working full time or with the whole family helping! Think of all the comforts and happiness this EXTRA INCOME will give you and your loved ones.

19,000,000 CUSTOMERS WAITING!

Yes — there's that many customers waiting right now for you to take their orders — get in on the opportunity of your lifetime. Let me show YOU how my plan permits YOU TO MAKE MONEY IMMEDIATELY.

NO ADDITIONAL INVESTMENT REQUIRED

Yes! Profits can start without additional investment. NO OTHER COMPANY has a plan like this — mine is the original "go in business on a shoe string" success plan. READ THE FACTS — it doesn't cost you a cent to investigate my wonderful plan — IT'S ABSOLUTELY FREE — it doesn't cost you anything NOW or EVER!

Go in Business on a Shoe-String

We Supply Everything
Largest variety of mountings & supplies.
Lowest Prices
Big Savings

INVESTIGATE
Look into this year round lifetime business NOW.
Complete details sent FREE. No obligation NOW or EVER.

DON'T WAIT - SEND TODAY

KIKTAVI COMPANY
DEPT. PS-5 2111 W. Manchester
Los Angeles 44, Calif.
As long as it's Free—tell me about it!

NAME _____
ADDRESS _____
CITY _____ STATE ____

KIKTAVI CO. Dept. PS-5 2111 W. Manchester Ave Los Angeles 44, Calif.

MAIL ORDERS

10" OR 12" Tops

Reconditioned and LOOK LIKE NEW!
Shipping Weight 5 lbs.

ARMY SURPLUS BOOTS

$8.95 VALUE!

IDEAL ALL WEATHER BOOT FOR WORK — SPORTS

LEATHER UPPERS—RUBBER BOTTOM

- Flexible double chrome, tanned, tough wearing leather uppers! • Leak-proof gusset tongue!
- Non-skid heavy duty rubber soles.
- SIZES 9-10-11-12-13

SAVE $6

$2.95

NEW—100% WOOL BLANKETS

62" x 82"

$7.95 VALUE!

$4.95

Soft, fleecy, warm. Closely woven nap, whipped ends. Ideal for every purpose.

Shipping Weight 4 lbs.

Choice of GREY or KHAKI

(30% Pure Wool—70% Pure Processed Wool)

NEW! MECHANICS TROUBLE LAMPS

50 FOOT CORD!

- 50 feet of Heavy Duty Rubber Coated Cord.
- Sturdy Switch built into handle.
- Rugged, shockproof Rubber Handle.
- 2 extra Plug-ins built into handle.
- Heavy duty steel wire guard.
- Removable Reflector Shield.

$4.50 VAL. COMPLETE **$2.95**

Shpg. Wght. 2 lbs. 10 oz.

NEW—DUAL TUBE PNEUMATIC SWIM FLOATS

FUN in the WATER with SAFETY!

Use as a RAFT — PLAYBOAT — HEADREST — LIFESAVER. LEARN TO SWIM etc. Inflates by mouth. In original carton!

FOR KIDS ADULTS $1.95 VAL. **59c**

Shipping Weight 3½ lbs.

NEW—AUTO COVERS

WHITE DRILL — 12' x 18'
Shpg. Wght. 9 lbs.
$15 VAL. **$8.95**

SEND FOR FREE CATALOG — AMAZING VALUES!

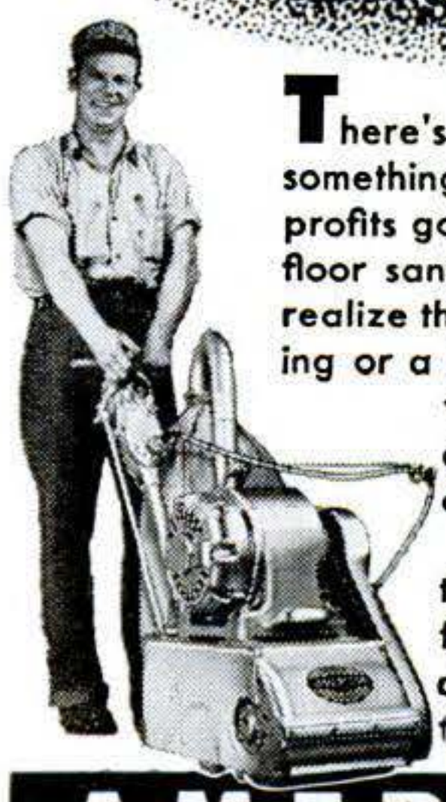
UNIVERSAL ENTERPRISES

DEPT. 5 P.S., 946 S. MAIN ST. LOS ANGELES 15, CALIF.

ALL PRICES F.O.B. LOS ANGELES

⅓ Deposit on C.O.D.'s • Pay by Check or Money Order

Be Your Own Boss



There's a great feeling to being in something for yourself, where all the profits go into your own pocket. American floor sanders make it possible for you to realize this ambition without special schooling or a big investment. Begin small and work up to as large an enterprise as you desire . . . It all depends on your ambition to get ahead.

Ask for "tell-all" booklet entitled "Opportunities in Floor Surfacing". Use coupon and enclose 25 cents in coin or stamps to cover handling.

AMERICAN FLOOR SURFACING MACHINE CO.

532 So. St. Clair St. • Toledo 3, Ohio

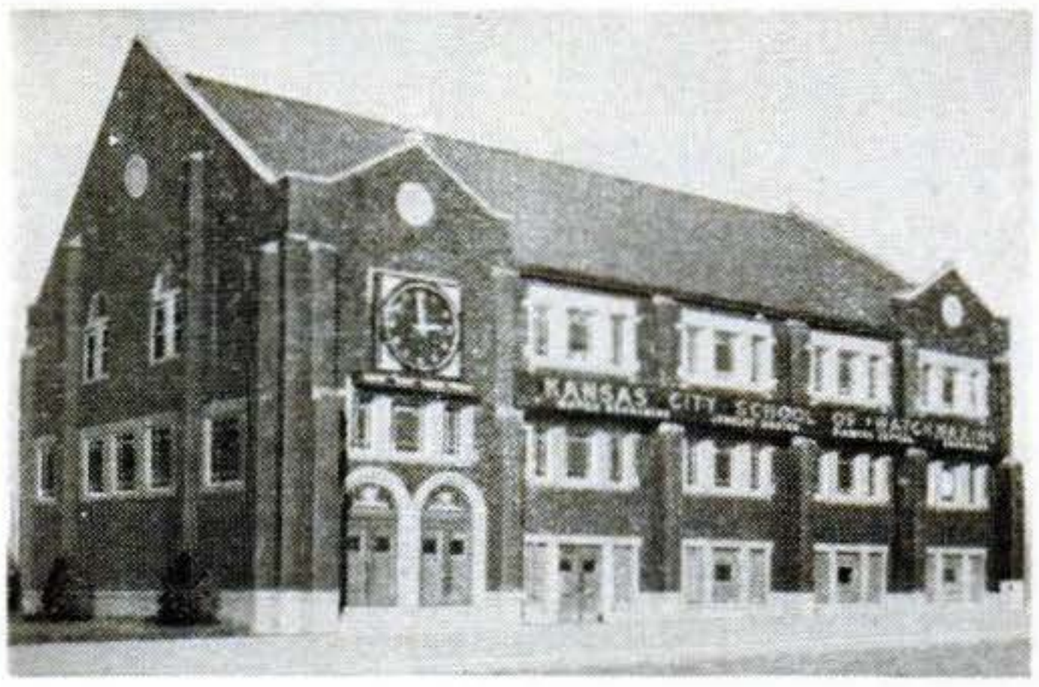
Gentlemen:
Enclosed find 25c in stamps or coin for booklet "Opportunities in Floor Surfacing," telling me how I can start my own floor sanding business.

Name _____
Street _____
City _____ State _____

Copyrighted material

Learn JEWELRY MAKING WATCHMAKING ENGRAVING

TRADES WITH GREATER SECURITY



Above Average Pay. Trained Men Always in Demand. Day and Night Classes. Enroll any Time. Write Today for Free Catalog and Information.

Approved for G.I. Training

KANSAS CITY SCHOOL OF WATCHMAKING

America's Most Progressive Horological School

619 WYANDOTTE ST. KANSAS CITY 6, MO.

READY CUT HOMES

Order Now

Homes $1835.00 and up. freight paid. Orders filled in order received. Save up to $1000 on modern production method homes. Much more compared with builders' prices. Anyone can assemble with simple plans furnished. Complete including paint, hardware, roofing, glass, nails, etc.

Send 35c in coin for full color catalogue showing 57 modern low-priced homes and floor plans. Low cost building plans complete ready for filing. Sold separately if desired.

Dept. PS-59

INTERNATIONAL MILL & TIMBER CO. Bay City, Mich.

NEW COLOR CATALOG FOR ONLY 35¢

STERLING HOMES

BURN WATER IN YOUR CAR!

MORE SPEED
MORE POWER
MORE MILEAGE
With
OCTAGANE WATER INJECTOR

Send Card for Information

COMMONWEALTH CARBURETOR CORPORATION
1478 UNIVERSITY AVENUE
BERKELEY CALIFORNIA

Carve for Fun and Profit!
No skill needed
with Dumore Carvit

Anyone can make woodcarvings with a Carvit! It copies low-cost models you can buy in any dime store. The result—beautiful ornaments, unusual gifts, fine carvings that sell.
Write for Free folder with full details

The Dumore Company
Dept. E-52 **Racine, Wisconsin**

MONEY for MEN ALL DATA FREE

THE PLASTEX Industry needs manufacturers on small scale and for big production of Lamp and Clock Stands, Art Goods and Novelties in Plastex and Marble imitation. Experience unnecessary. ½c material makes regular 10c store sellers. Rubber moulds furnished for speed production. Small investment brings good returns. Big chain store orders now being placed. Ambitious men have chance for real prosperity. Our Free booklet will interest and benefit you.

PLASTEX INDUSTRIES, Dept. 2, 3400 Third Ave., New York 50, N. Y.

Learn A Trade NOW! PRACTICAL SHOP TRAINING!

In Our Chicago Shops

- ☐ AUTO MECHANICS
- ☐ DIESEL MECHANICS
- ☐ REFRIGERATION
- ☐ BODY-FENDER
- ☐ WELDING—ARC and GAS
- ☐ MACHINIST
- ☐ PIANO TUNING

Above Approved For G. I.'s and Civilians
One of America's Leading Practical Schools
7 Floors of Fully Equipped Shops
Over 48,000 Successful Graduates
Expert Individual Instruction
Learn by Doing—Low Living Expense
Established 1902—Day and Evening Classes

Also the following Home Study Courses

☐ PLASTIC ☐ REFRIGERATION ☐ DIESEL

CALL IN PERSON OR MAIL THIS AD TO

GREER SHOP TRAINING

(Desk 12) 460 South State St., Chicago 5, Ill.

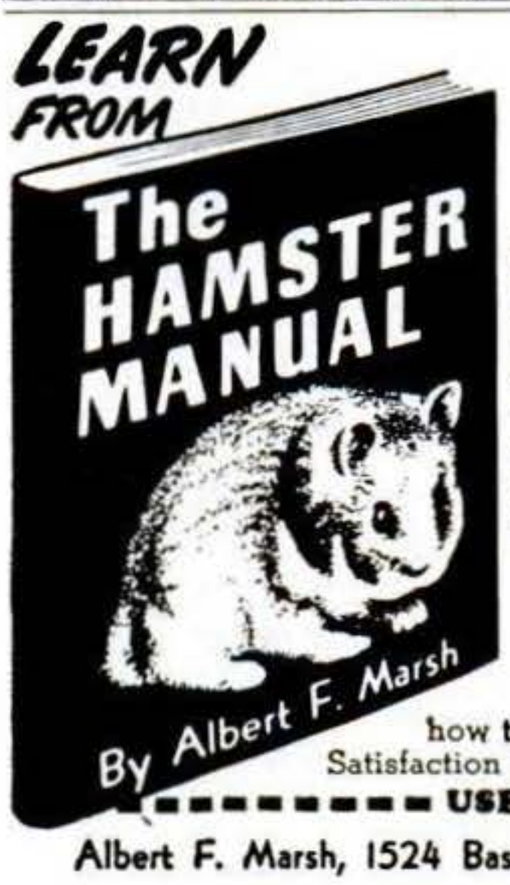
Please send without obligation free information regarding trade checked above. (Specify whether you are a Veteran ☐ or Civilian ☐)

Name.....Age.....

Address.....

City.....State.....

LEARN FROM The HAMSTER MANUAL



ABOUT THE NEW PROFITABLE HOBBY INDUSTRY

The most complete book on successful breeding and raising of Golden Hamsters. Tells all about this new, fast growing, profitable, interesting hobby industry. Reveals all secrets of the largest breeder of these delightfully profitable pets and laboratory animals. 34 chapters chuck-full of information from actual experience as a breeder. 20 pages of illustrations. A few subjects are: history, housing, breeding, sexing, feeds, fertility vitamins, handling, educational, scientific projects, crating, profits, selling, where to buy, how to sell hamsters. Sent postpaid for $1. Satisfaction guaranteed or money refunded.

USE THIS COUPON

Albert F. Marsh, 1524 Basil Street, Mobile, Alabama

Name _____

Address _____

City _____ State _____

Copyrighted material

HOME WORKSHOP AT BARGAIN PRICE. Accurate and precise 2 speed guaranteed hobby lathe, the essential machine for the home workshop. Sturdy enough for light production work or factory standby service. Supplied with 56" of belting for connecting to any available electric motor or power take-off, such as on a jeep or tractor. Also included in this unbelievable offer are such accessories as a ½" drill chuck with specially hardened tool steel jaws, a 4" electric furnace high speed grinding wheel, a cotton buffing wheel with a large supply of buffing compound, and a 4" steel wire scratch brush. Your cost **$6.00.** Sole export agent. Distributor inquiries invited.

RT-1711 Brand New 12 Tube, 110 Volt Receiver-Indicator-Oscilloscope complete with all tubes and power supply. Has telescoping hood over scope tube, which is equipped with a detachable calibrated screen. Has centering and amplitude controls and two video inputs. A natural for television.....**$39.95**

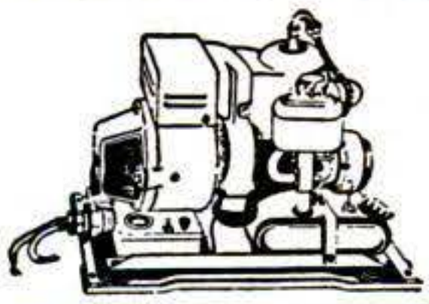
Sensational Value in AC-DC POCKET TESTER

This analyzer, featuring a sensitive repulsion type meter housed in a bakelite case, represents the culmination of 15 years achievement in the instrument field by a large company specializing in electronic test equipment. Specifications of the AC-DC Model Volt-Ohmmilliammeter:

ACVolts—0-25, 50, 125, 250
DCVolts—0-25, 50, 125, 250
Milliamperes AC—0 to 50
DC Milliamperes—0 to 50
Ohms Full Scale—100,000
Ohms Center Scale—2400
Capacity—.05 to 15 Mfd.
Total Price, prepaid anywhere in the USA—**$7.00.** Similar DC Meter, lacking the AC operated ranges of above, **$5.50** prepaid.

Our PE-109 DIRECT CURRENT Power Plant

This power plant consists of a gasoline engine that is coupled to a 2000 watt 32 volt DC generator. This unit is ideal for use in locations that are not serviced by commercial power or to run any of the surplus items that require 24-32v-DC for operation. The price of this power plant tested and in good condition is only **$79.95** F.O.B. Buffalo, or we can supply in strictly "as is" condition for **$58.95** F.O.B. our New York City warehouse. These latter are exactly as received, in heavy steel-strapped gov't cases, and we are unable to determine if the individual units are new, or what the condition is if used, while the **$79.95** are some of the same that we have brought to Buffalo for testing and repair if necessary. We do not recommend gambling on the "as is" condition, except for quantity purchasers. We can also supply a converter that will supply 110v AC from the above unit or from any 32v DC source for **$12.95.**



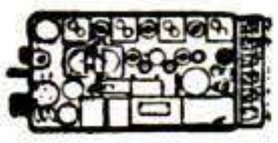
6.95 TAKES ALL THREE BIG BARGAINS

BANDSWITCHING TUNING TURRET made by Western Electric. Covers 4 bands above 100 MC. All coils wound with #14 silver-plated wire. Complete with tuning condensers and powerful electric driving motor. Diagram included. ONE OF OUR MOST TERRIFIC VALUES—ONLY $2.95.

AUDIO AMPLIFIER—Brand new. 2 stage triode amplifiers having 2 of the valuable and scarce ouncer type audio transformers that sell for over $10.00 a piece. Neat aluminum case fully enclosed (largest dimension 6 inches). Perfect for intercom system, phono amplifier, mike amplifier or signal tracer amplifier for testing radio sets. A sensational bargain at only.....**$3.40** each

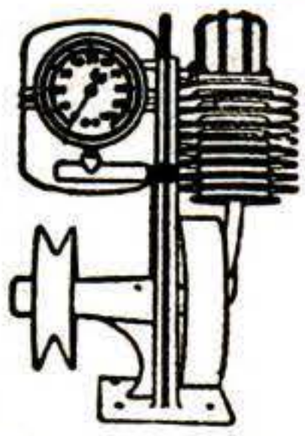
DUAL METER—One 50 uA and one 200uA movement in the same case. This meter is ideally suited for use as a combination modulation percentage and carrier shift indicator. If desired the movements may be removed from the case and used separately for voltmeters, ohmmeters, meters, etc. All meters are in perfect operating condition, but a few have cracked glasses. This super value costs only.....**$1.95**

RT1655
***Only* $14.95**



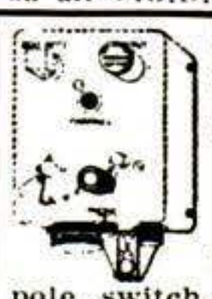
11 tube crystal controlled **superheterodyne receiver** that covers the FM band. The ultra modern circuit uses the latest types of tubes including 7 miniature 6AJ5's. Beautiful chassis and aluminum cabinet. Tubes and diagram included.

COMPRESSED AIR INSTANTLY ANYWHERE



Portable Air Compressor and storage tank. Ruggedly built of best materials using lifetime lubricated ball-bearing on connecting rod and oil impregnated main bearing on shaft. Unusual design forever eliminates valve trouble, the most common fault in air compressors. **PATENTED** unique air intake system increases efficiency tremendously over other compressors so that air output is much greater than that from larger compressors powered by heavier motors. Will deliver approximately 3500 cu. inches of air per minute at maintained pressure of 30 lbs., or will inflate a 90 lb. truck tire in less than one minute. Comes complete with 100 lb. gauge, although finger-tip adjustment allows setting of output pressure at any value, which will automatically be maintained. Works from any ¼ H.P. motor. Useful for spraying paints or lacquers, disinfectants, insecticides, annealing or brazing with natural gas, inflating tires, etc. Price **$14.50** postage prepaid anywhere in the U.S. Efficient, completely adjustable syphon type spray gun complete with 12 ft. of 100 lb. tested hose available for only **$7.75** with pint container, also prepaid. 25% required on all C.O.D. orders.

STROMBERG—CARLSON— Power Switching Relay Box. Neat 3½x4x5½ Steel case with tight fitting cover finished in Stromberg's usual beautiful chocolate color crackle finish—**98c.**



REMOTE CONTROL UNIT—Aluminum case 4 x 3 x 2 containing 2 potentiometers, triple pole switch, 4 knobs, phone jack, gear mechanism and revolution counter—**99c.** With 8 prong JAN connector to fit box—**$1.39.**

All sales final and no returns unless otherwise specified in ad of item. Right reserved to change prices and specifications at any time. Cable address BUFRAD.

BUFFALO RADIO SUPPLY, 219-221 Genesee St., Dept. PS BUFFALO 3, N. Y.

WALL MODEL

TELEPHONES

We can meet any intercommunication telephone requirement.
Telephone set, 2 of either model **$17.95** Complete with batteries, wire, etc. Telephone supplies and parts of every description. 25% deposit with order, balance C.O.D., F.O.B. Brooklyn.
INQUIRIES WELCOMED

DESK MODEL

EASTERN TELEPHONE CO. Dept. PS-4 320 18th St. Brooklyn, 15, N. Y. SOuth 8-6161

SAVE ON TOOLS

MECHANICS **NET PRICES**

Send 25c in stamps for "Illustrated Catalog." Hundreds of Nationally Known, NEW & GUARANTEED Hand & Specialty Tools at Mechanics **NET** prices. Guaranteed by manufacturers. **NOT** War Surplus.

Gizmo Supply Company P. O. Box 656L San Francisco, Calif.

LEARN TO RIDE IN 5 MINUTES!

BILL STERN OF NBC

NEW *Indian* LIGHTWEIGHT MOTORCYCLES

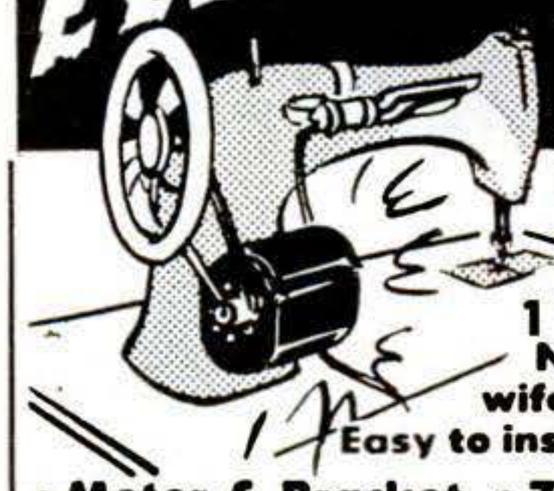
Send for FREE Booklet "How I Learned to Ride a Motorcycle" By Bill Stern, Sports Director, NBC

"WORLD'S MOST MODERN MOTORCYCLES"

For threading crowded traffic or parking in tight spots . . . for "going places" on weekends or vacation . . . for sheer, exhilarating sport, there's nothing like an Indian lightweight. So safe, so easy to ride, you can learn in 5 minutes. Amazingly economical. Get the facts—Send for FREE BOOKLET!

INDIAN MOTOCYCLE CO., Dept. PS59
Springfield, Mass. • DEALER INQUIRIES INVITED

ELECTRIFY your SEWING MACHINE



NEW REDUCED PRICE
$12.95
1 YEAR GUARANTEE
Now, make mother's or wife's sewing a pleasure.
Easy to install. Fits ALL machines.

- **Motor & Bracket**
- **7 Speed Foot Control**
- **AC-DC 60c. 115v.**
- **Cord Set**
- **PULLEY & BELT**
- **Complete Instructions**

SEND NO MONEY, pay postman plus C.O.D. or enclose money order and we will pay postage. MONEY BACK after five days if not completely satisfied. Shipping Wt. 6 lbs. State whether wheel on your machine turns towards or away from you.

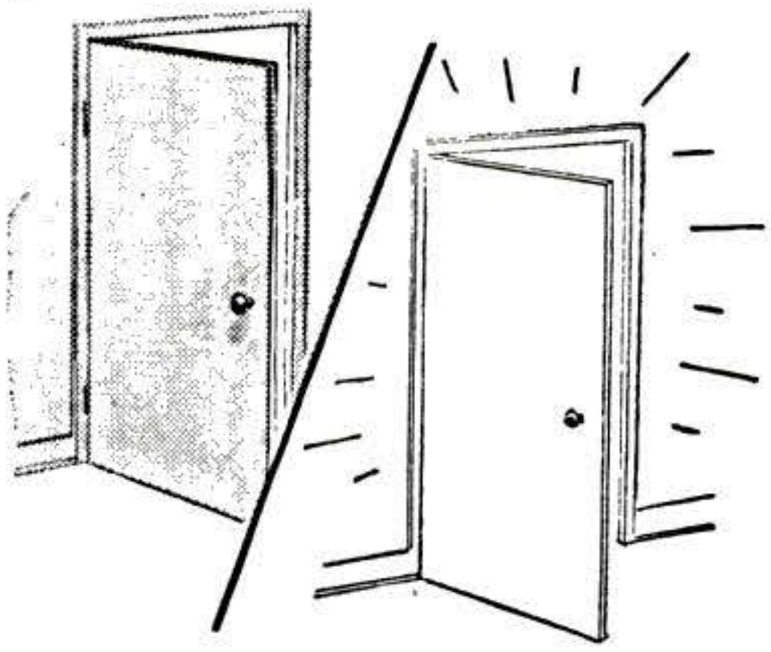
LUGGAGE CARRYING CASE $9.95
Specify base width, length and make of your machine. Wt. 11 lbs.

FREE CHROME plated SEW-LITE completely eliminates eyestrain.

CONTINENTAL SALES COMPANY
Dept. PS4, 235 E. 59 St. New York 22, N. Y.

Copyrighted material

What makes the difference?



LIN-X
CLEAR-GLOSS VARNISH

Yes, and what a difference! That clear, tough, long-lasting coat of Lin-x Clear-Gloss Varnish protects and beautifies floors, woodwork, furniture, printed linoleum, boats, countless other surfaces—resists boiling water, sizzling cooking greases, alcoholic beverages. *And* so EASY to use—just brush it on!

At your paint, hardware and department store!

REPLACEMENT OR REFUND OF MONEY
Guaranteed by Good Housekeeping
IF NOT AS ADVERTISED THEREIN

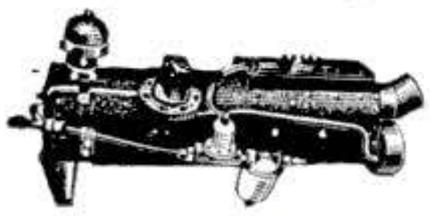
Distributed by
Acme White Lead & Color Works, Detroit • The Lowe Brothers Co., Dayton • John Lucas & Co., Inc., Philadelphia • The Martin-Senour Co., Chicago Rogers Paint Products, Inc., Detroit • The Sherwin-Williams Co., Cleveland

SURPLUS HYDRAULIC PUMP

Genuine Vickers constant displacement high pressure pump. Use it for any type of liquid pumping job. Will pump 400 gal. per hour at 3750 R.P.M. Precision piston type design provides 1000 lbs. per square inch pressure. Self priming. Standard thread 3/4 inch intake and discharge ports. With 5/8 inch splined shaft—just add pulley and power and you're ready to go.

HAS HUNDREDS OF USES

These pumps are brand new. Original acquisition cost approx. $100.00. Can also be used as hydraulic motor; for rams, opening doors, hydraulic lifts, etc. also for any liquid transporting job. War surplus, but brand new. Shp. wgt. 7 lbs. Will include at no extra charge an hydraulic control valve and ship postpaid when remittance accompanies order. (Control valve, only $1.95.) Satisfaction guaranteed. Rush your order today. **$9.95**



SURPLUS BARGAIN
AIRCRAFT COMBUSTION HEATER

15,000 BTU, fuel vapor type heater utilizing air ram for greatest efficiency. Size 23" x 7" x 3". Complete with stainless steel heat exchanger, fuel filter, solenoid valve metering device, 24V firing unit, relief valve, diaphragm switch, etc. Instruction booklet furnished. Shipped in original factory box, total weight 30 lbs. Now selling at only..... **$12.95**

F.O.B. HOUSTON. SEND CHECK OR MONEY ORDER

SOUTHWEST AERO SUPPLY Dept. PS5, Drawer 488 South Houston, Texas

HAVE THAT **BOLD, VIRILE LOOK!**

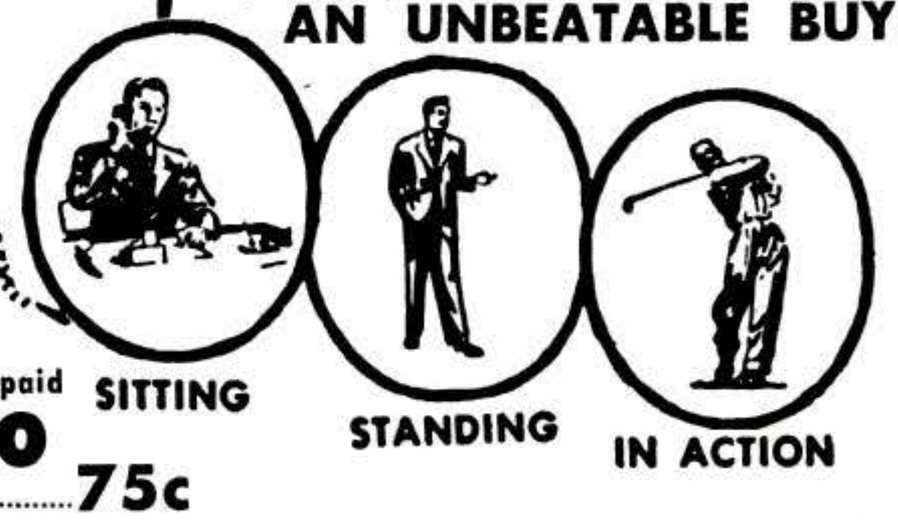
Sportflex

TRIMS and SLIMS you

Gently, FIRMLY restrains bulges; eases you into upright, perfect posture. You look—you feel younger!

Of *quality* Lastex; sturdy, resilent, porous, non-chafing. Wide 2-Way Stretch Band can't roll, bunch or bind. Soft, smooth, detachable Crotch gives sanitary, super-support. Launders like magic.

AN UNBEATABLE BUY



complete postpaid **$3.00**
extra crotch..... **75c**

Count on **SPORTFLEX** *for comfortable, contour control*
DON'T DELAY! Send CHECK—MONEY ORDER Today
IMPORTANT! Please specify waist size. C.O.D.'s accepted

Sportex Foundations
Dept. PS, 14 W. 17 St. N.Y. 11, N.Y.

DECORATIVE METAL WORK

A new manual for the amateur. Tells in easy to understand language how to make useful metal articles in your home workshop. You'll be surprised how easy and interesting metal work really is. **Fully illustrated** with diagrams and step-by-step instructions. Sturdy cloth binding, 253 pages. Send only $2.00 and your copy will be sent postpaid.

POPULAR SCIENCE MONTHLY—Dept. 59
353-4th Ave. New York 10, N. Y.

FREE PLANS **POWER MOWER KITS** FREE PLANS

Have one of the finest mowers money can buy. Write for FREE PLANS and PARTS LIST showing you how to SAVE up to 75% by assembling Triangle's POWER MOWERS.

3 WHEEL MODEL

SPECIAL FACTORY PRICES
Kits, Parts, Engines, Wheels, Etc. Also complete TRIANGLE MOWERS ready to mow, at Low Factory Prices. 3 and 4 wheel Models.

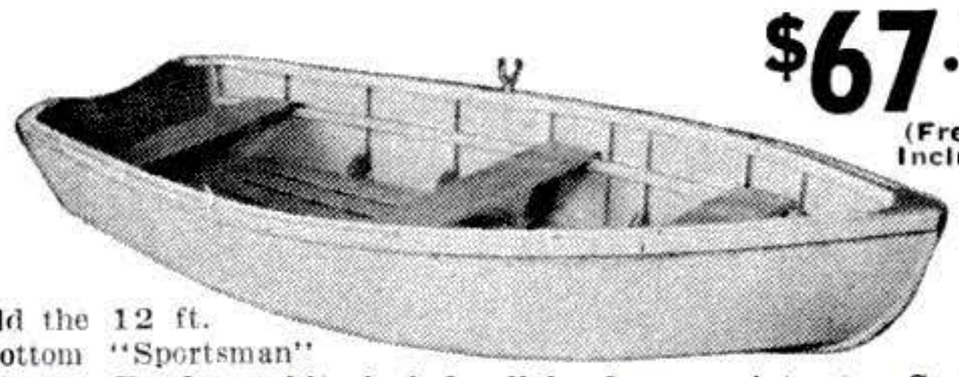
4 WHEEL MODEL

SAVE your back. Assemble or build your own 3 or 4 wheel power mower with our precision made kits and parts. Write today for full facts, Free Plans, Parts List, Low Factory Prices. DEALERS INVITED.

TRIANGLE MANUFACTURING CO., Dept. S-3, Box 185, Fort Scott, Kansas

PLYWOOD BOAT KITS

$67.50 (Freight Included)



Build the 12 ft. V-Bottom "Sportsman" as shown. Ready-cut kits include all hardware, paint, etc. Send for free folder on all models as low as $29.95, freight included.

TAFT MARINE WOODCRAFT
Dept. "R," 636 39th Ave. N.E. Minneapolis 21, Minn.

Copyrighted material

NEW! Low-priced, lightweight

BSA BANTAM 125

This outstanding lightweight looks and performs like many far bigger and heavier models —yet it consumes less gas than any other motorcycle you've known...and it's built to rigid specifications for years of reliability!

7 Amazing Features

- Telescopic Forks—just like the big jobs!
- Hand-operated clutch, smooth, silent and hard-wearing!
- Foot-operated Gear-shift—the easiest and safest way to change gear!
- New Right-hand AMAL Twist-Grip throttle—for instant and swift acceleration!
- Full-valanced mudguards—real weather protection!
- 15% lighter than others. Weighs only 150 lbs.
- Designed and produced in its entirety by world-famous B. S. A.-Sunbeam!

COUPON
TEAR IT OUT NOW!

Please rush me at once full details of the new B. S. A. 125 Lightweight Motorcycle. Also send literature describing the other nine larger models which comprise the B. S. A.-Sunbeam range.

M-S2

Name_____

Address_____

State_____

RICH CHILD CYCLE CO., INC.
SOLE IMPORTERS
22 East 29th Street, New York 16, N. Y.
and 2510 West Slauson Avenue,
Los Angeles 43, California

HIGH PAY • SECURITY
When You
LEARN A TRADE

Get ready for a well-paid, lifetime job or a business of your own in one of these FIVE ESSENTIAL TRADES. Complete training under expert instructors with practical experience prepares you to step into a good paying job with a future and security.

ELECTRICITY: Basic electricity, Residential and Industrial Wiring and Appliance Repair

PLUMBING: Every phase — pipe cutting and threading to complete installations, blue print reading.

AUTOMOTIVE & TRACTOR: Engine overhaul, Transmissions, Carburetion, Generator-Ignition Systems, Tune Up

DRAFTING: College level training in general Machine and Architectural Drafting.

SHOE REPAIRING: Complete practical training includes reconditioning and rebuilding.

Approved For Veteran's Training

NATIONAL TRADE SCHOOL
DEPT. C • 2610 Grand • Kansas City 8, Mo.

Without obligation to me please send full information on the course checked.

.....Automotive and Tractor Technician ..... Drafting
.....Plumbing .....Electricity .....Shoe Repairing

Name.....Age.....

Address.....

City.....State.....

Veteran?.....

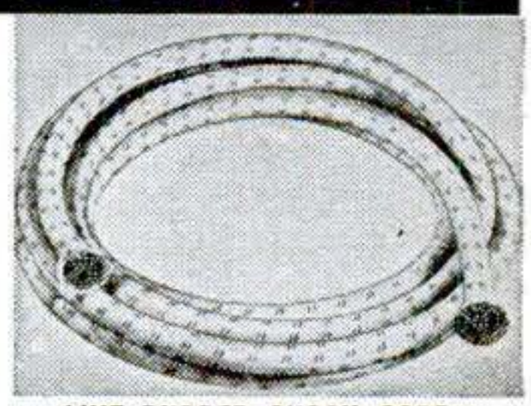
UP TO 80% SAVINGS ON WAR SURPLUS

LT. WT. ALUMINUM PIANO HINGE

Length 72 inches, thickness .040—width 1¼"— Operating radius 275 degrees. Made of aluminum alloy, sold in 6 feet lengths only— per length.... **$1.14**

HEAVY DUTY STEEL PIANO HINGE

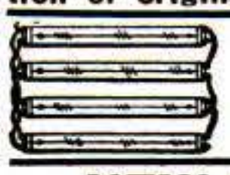
Length 56"—Thickness 3/32"—Width (open) 3-5/16"—Operating radius 330 degrees—Made of heavy duty steel—Drilled ready for use. Ideal for drop tables, heavy tool boxes, heavy doors, and many other uses where heavy hinges are required. Sold in 56" lengths only. Ship. Wt. 7 lbs. **At a fraction of original cost..... $1.45**



LIVE RUBBER SHOCK CORD

Made in accordance with rigid army specification. Clean fresh stock. ⅝" contains approx. 500 strands of live rubber. ⅜" approx. 100 strands. ¼" approx. 40 strands. Sold in 25 ft. lengths or more. At about 20% of original cost.

DIA.	PRICE (per 25')	Ship. Wt.
¼"	$1.00	2 lbs.
⅜"	$1.25	2 lbs.
⅝"	$1.75	3 lbs.



HEATING ELEMENTS

For home made photo print dryers, chicken brooders, etc. Wiring diagram for use on 110-volt. **Set of four..... 96c**

NEW 10½ x 4 WHEEL ASSEMBLY

6 ply tire 10" high, 4" wide plus new tube plus 4" ball bearing wheel with grease fitting. Uses ⅝" axle. Ideal for midget soap-box racers, wheel-barrows, trailers, etc. Ship. wt. 8½ lb. **ONLY..... $9.95**

6 VOLT DOUBLE SHAFT MOTOR

1/30 horsepower motor made by Delco. This is a 6 volt D.C. motor with two ¼" shafts, used on Auto Heaters, Auto Fans, etc. Ideal for use in the shop, garage, and wherever 6 volt D.C. is available. Ship. wt. 3 lbs. List price is $4.20, our price is a real money saving buy. **Our price, only..... $2.95**

Prices F.O.B. Chicago. Include approx. postage on orders paid for in advance. C.O.D. orders enclose 25%, balance sent C.O.D. WRITE FOR FREE ILLUSTRATED CIRCULAR.

U. A. S. Corp. Dept. PS-5 5637 W. 63rd Pl. Chicago, Illinois

Copyrighted material

SAVE UP TO 85% in WAR SURPLUS-SENSATIONAL VALUES at "GADGETEER'S HEAVEN"

IN MANY ITEMS WE HAVE THE WORLD'S LARGEST SUPPLY

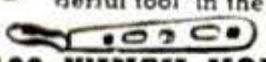
NEW 1949 CATALOG 92 PAGES—ILLUSTD. SEND 25¢ TODAY!

New Hydraulic Cylinders, Valves, Pumps, Fittings, Hose and Tanks

51 SIZES AND TYPES. WORLD'S LARGEST SUPPLY 1001 Labor Saving Adaptations for Pulling. Pushing. Lifting Operations. Finest Precision workmanship and materials. Liquid and/or Air Operation. developng terrific power. 20,000 Available. Write for Catalogue Priced to sell at 15% Gvt. Cost

WINCH HOISTS

Thousands of satisfied users. Hundreds have written, the most wonderful tool in the world.



No. 100 WINCH HOIST

Cap. 2500 lbs. with 24-1 ratio controlled bronze worm gear. 19'. 1/4" alloyed steel cable with hook. two speed handle. Ideal for Garage. Truck ldng. Mach. Shops Boat Bldrs., etc. $100 Val. **$15.99**

Genuine Red Seal 4 Cycle Air Cooled L head

CONTINENTAL GAS ENGINE

standard equipment inc. Mesh type air cleaner. flywheel. magneto. float type carburetor. blower housing. muffler. fuel tank. fuel filter with shut off valve. starter pulley. etc. The ideal power package for light tractors. lighting plants. compressors. boats. lawn mowers. etc. And cast your eyes at this price

Used but Guaranteed Condition **$32.75**

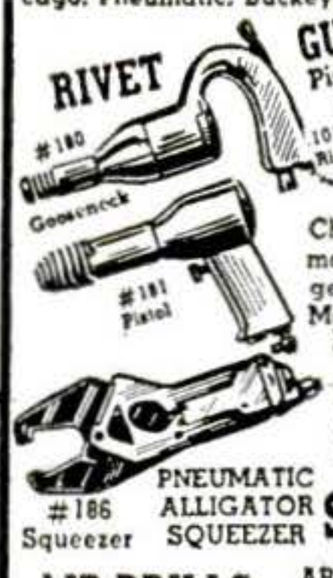
A $75.00 VALUE NEW For ONLY **$47.95**

New BRIGGS & STRATTON MODEL "A" GAS ENGINE

Rating 2.10 H. P. 4 cycle. single cylinder Complete in original Factory Crates. A $102 Value for Only **$64.95**

PNEUMATIC AND AIR TOOLS

10,000 in various popular makes. sizes. types. Cleco. Aro. Ingersol Rand. Chicago. Pneumatic. Buckeye. etc.



RIVET GUNS Pistol & Goose-neck Type

101 Uses. Chipping. Riveting. Hammering. Breaking cement and auto body work.

Chicago Pneumatic. Cleco. Ingersoll Rand Makes. E3. E2. 3X. 2X. OY $55 Value **$8.95**

#186 Squeezer PNEUMATIC ALLIGATOR SQUEEZER $80 Value **$15.95**

New Electric Motors

#500 new 1/2 H.P. 27 Volt D. C. 24 Volt A. C. This motor can be readily adapted to 110 A. C. by the simple method of rearranging armature brush leads. We furnish free diagram of instructions with each order. A Sensational Value **$5.95**

Converted to 110 A. C. Equipped with plug and 3½ ft. Heavy Duty Cord **$8.49** ea.

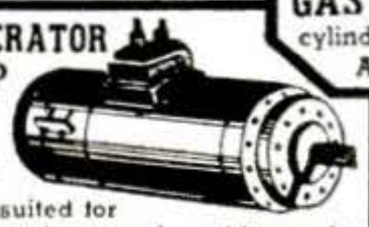
1/16 H. P., 24 Volt D. C. Motor. Series Wound. New. #501. **$3.95** ea.

#502 - 2 H.P. 24 V.D.C. usd. **$8.95**

U. S. ELECTRICAL 28V MOTOR

1/3 H.P., 8400 R.P.M., 16.5 Amps. Continous Duty **$5.49** ea.

DC GENERATOR 140 AMP



Direct Current Generator. especially suited for adaptation to homemade welding unit

A fast moving item at **$17.95**

P-1 GENERATOR 200 AMP **$22.50** ea.

T-1 GENERATOR 12 V., 25 Amps

at 1800 to 4200 R.P.M. Trucks Aircraft, Radio. A Real Value **$13.95**

D. C. METERS

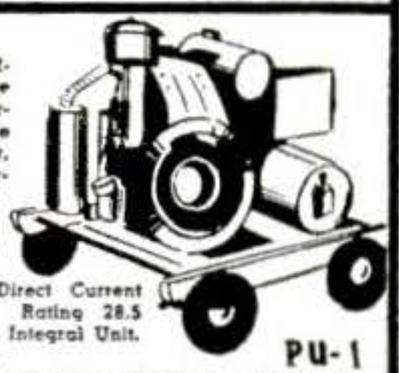
AMMETERS 30 - 0 - 30 | 60 - 0 - 60 | **$4.25**

0 - 30, 0 - 120, 0 - 240, 0 - 300 **$3.95**

Comb. Voltmeter-Ammeter 30V - 30 Amp. 30V - 60 Amp. 30V - 120 Amp. **$4.95**

30. 60. 120. 240 or 300 Amp. SHUNTS required with use of DC Meters **$1.00** ea.

POWER UNIT



The Complete Model GKB 12-24-100 Consists of a Single Cylinder. Air-Cooled. Four-Cycle Briggs-Stratton Gasoline Engine. Type Single Cylinder. Air Cooled. L-Head. Four-Cycle. 6 H. P. Bore 3". Stroke. 3¼". Governed for Speed Between 2500 - 3200 R. P. M.

Directly Connected to a Direct Current Generator of 2800 Watts. Rating 28.5 Volts. 100 Amps. to form an Integral Unit. Fuel Container 1¼ Gallons.

PU-1

The Engine and Generator are Mounted on Four Shock Absorbing Rubber Motor Mounts Attached to a Channel Iron Base. 4 Wheeled for Mobility can be used as Lighting Plant or Power Supply. A TERRIFIC VALUE!

6000 USED -OVERHAULED! ONLY **$79.89**

New Westinghouse AIR COMPRESSOR

Thousands now in use for spraying. inflating. tractors. trucks. garage. laboratory. air tools. industrial use. etc. Lightweight but powerful. can be run by ½ H. P. Motor or Gas Engine. Operates in either Direction or rotation. Gives approximately 3.27 CFM at 600 RPM. 6.54 CFM displacement at 1200 RPM. Has 2 inch bore. 1½ inch stroke. Suggested pressure 75 P.S.I. Size 9" x 12" x 16½" Weight approximately 23 pounds. AT THIS NEW LOW PRICE **$23.95**

Motors. Tanks. Fittings to Adapt this Unit also Avble.

AIR DRILLS OR MOTOR SPECIAL

ARO PISTOL $15.00

with 1/4" JCB Chuck

THOR #210R Model 4526 REVERSIBLE AIR DRILL

2300 R.P.M. Xlnt. for Tapping **$19.95**

PNEUMATIC ANGLE DRILL

$12.50 With Terry Adapter ea.

Send for Catalogue and List of Other Sizes. Types of Pneumatic Tools.

HERE THEY ARE! THOSE TERRIFIC MIX VALUES

GADGET MIX

Especially prepared for the HOBBYIST. Rivets. Spacers. Bolts. Screws. Nuts. Gears. etc. A gold mine. #106. 5 LBS. **$1.19**

BEARING MIX

Needle. Ball & Roller Bearings in excellent assortment. Sizes from 1/2" to 2". One of our "BEST SELLERS". 15 BEARINGS #170 for ONLY **$2.95**

HINGE MIX

12 pairs of strap and butt Hinges. Sizes 1" x 1" to 1½" x 4" in length to 8" strap. #170H. A $3.00 Value FOR ONLY **$1.09**

ABRASIVE AND GRINDING WHEEL MIX

50 Pieces including honing stone. pencil rolls. wheels. Abrasive sheets. etc. A really sharp value. #170AG. **99c**

SPRING MIX

Torsion. Compression & Tension Springs. asstd. sizes. A treasure trove for emergencies. #206 2 LBS. for ONLY **89c**

COMBO-MIX

Comb. of all above. all in one pkg. deal. At special Introductory price **$5.79**

SWITCH MIX

12 assorted types of Aircraft Switches. Including double & single throws. double & sgle poles & multiples. Voltage ratings from 5 to 20 amps. 125 Volts A. C.. 35 amps. 24 Volts D. C. 1001 uses in Auto. Truck. Tractor. Jeep. Shop. Radio. **$2.95**

FILE MIX

Ten Assorted Files of 6". 8". 10". 12". includes 3 Vixens. half rounds. bastards. mills. etc. in seconds and used but in good condition. 1 Vixen alone worth our price for the entire mix **99c**

LENS MIX

THE PHOTOGRAPHERS FRIEND

10 pieces of precision finished lenses. and first surface mirrors. Including the following A 31 mm dia. double lens. A 85 mm dia. lens with speed Fig. a complete set of 3 lenses. one double concave. two objective plano-convex. each having a 12" focal length. one 3½" dia. plano-convex lens with a 9" focal length

Also 3 double sided first surface mirrors totaling 37 square inches. worth $10.00.

Make your own projector. portrait and enlarging lens magnifiers. photo spots. etc. You'll brag to your friends about this one for ONLY **$5.49**

NEW PRESSURE TANKS

Stainless steel - Shatter proof. Rustless. 10,000 available in 6 different sizes. 1001 uses.

G-1 12½ x 24 inches - 2100 Cu. in. capacity 29 cu. ft. **$4.75**

D-2 6½ x 24 in. - 500 Cu. In. capacity 7 cu. ft. **$2.49**

F-2 8 x 45 in. - 1000 Cu. In. capacity 14 cu. ft. **$3.95**

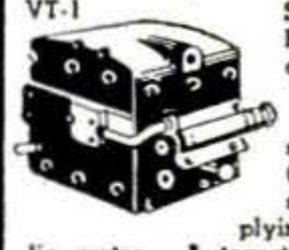
A-4 5" x 8" 104 cu. in. Capacity **$1.35**

Excellent portable tanks for carrying air in car or trailer. Ideal for painting. cooking. spraying. ocean buoys underwater fishing or diving. #OR-1 Oxygen Regulator with 500 lb. guage will fit all tanks **$1.39**

JUST PURCHASED $500.000 INVENTORY OF CUTTING TOOLS. TAPS. DRILLS. MILLING CUTTERS. TREMENDOUS SAVINGS. WRITE FOR LIST.

Vickers Hydrlic Transmission

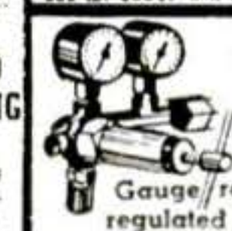
VT-1



Self contained. 2 H. P. constant torque at all speeds with variable volume reversible. piston pump (controlled by outside lever) supplying piston hydraulic motor. Automatic pressure. dash pot for smooth control. Power output R. P. M. -0 to 1/3 input R. P. M. in both directions. Input R. P. M. 1800 continuous 4000 intermittent. Dash pot can be removed for greater R. P. M. Ideal for Lathes. Duplicator Setup on Mills. Conveyors. Small Cars. Drives. Gearing. Etc.

COST GOVERNMENT APP. $400.00 You'll Chortle when you get it for ONLY **$19.50**

AIR CO OXYGEN REGULATOR



Latest design. lightweight dual gauge regulator unit. Gauge range from 0-220 P. S. I. regulated pressure 0-3000 P. S. I. bottle pressure. Designed for safety factor of 2400 P. S. I. Fits all standard Oxygen high pressure bottles. used in welding. torch cutting. Oxygen breathing.

Compare this value anywhere **$12.50**

Electronic Transmission Gear Train

GT-1 Containing approx. 50 Bronze Spur & Pinion Gears ranging from 3/8" to 4" dia.. 5 sets of 7 cluster gears. 2 complete worm & worm gear drive sets. 40 N. D. ball bearings from 1/2" to 1½" dia. watch springs. bushings. posts. face plates. housings. Micro Switches. 2 miniature. controlled clutches. etc. 19 lbs. of Pleasure and profit. A Tremendous Gadget Mine. Only **$8.49**

Gears in above train are all in multiple size and sequence with identical teeth ratio giving hundreds of ideal gear reduction combinations.

GEAR BOXES

VTG-1—90°. 1½ to 1 bevel gear reduction. ¾" dia. with lever control for engaging & disengaging positive clutch. dust proof housing. prelubricated. brngs. size 7"x6". A lifetime value **$3.95**

VTG-2—Inline spur gear reduction 16 to 1. thru 4 gears. Final take-off 4½" dia. 26 tooth. ¾" Alum. spur gear with lever control for engaging and disengaging positive clutch. dust proof housing. prelubricated. bearings. size 12"x8". Only **$6.49**

Both above gear boxes can be used with above Transmission.

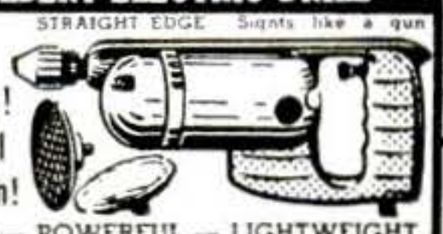
High Pressure Oxygen Bottle

New. Will hold up to 3,000 lbs. PSI. with Co2 used as tire inflator or fire extinguisher. with oxygen for sick room or deep-water diving. etc. Completely equipped with brass valve. 36" hose. Dial gauge. & canvas bag. **$2.29**

NEW GILBERT ELECTRIC DRILL (¼)

STRAIGHT EDGE Sights like a gun

Here it is! That Drill Sensation!



SMOOTH — POWERFUL — LIGHTWEIGHT RUGGED. A Guaranteed. Precision tool for wood or metal. Latest streamlined design. Fingertip switch control. Self Lubricating Shaft Bearings.

Tested at 115 Volts • R.P.M. 1620 Chuck: Jacobs Type 1/4" key chuck Weight: 4¾ lbs.

It's Ready NOW!! At your service at cut-to-the-bone-prices. ORDER TODAY!

Complete Drill & Chuck ONLY **$19.95**

Including Sander and Buffer **$21.95**

AIRCRAFT CABLE

Alloyed steel. rust resistant. 3/16" dia. 18 ft. long. with turnbuckle ends. **99c** ea.

On reels in any length

1/16"	3c ft.	3/16	6c ft.
3/32	4c ft.	1/4"	8c ft.
1/8	4½c ft.	9/32	9c ft.
5/32	5c ft.	3/8"	12c ft.

FIRE EXTINGUISHER

Kiddie Lux Co2 Type. Built to Gov't. spec. wirebound shatterproof Heavy Case. Fully recharged. 3¼ lb. - 26" x 4". Trigger control with horn 4TB type. $35 Value #601A **$13.25**

2 lb. Co2 type $25 Value #602 **$11.75**

10 lb. Charged with horn Co2 $65 Value #603 **$25.75**

15 lb. Break Disc type New #605A $75 Value **$29.75**

15 lb. Wheel Control #605B **$32.95**

15 lb. Squeeze grip. New #605C. $85 Value **$39.95**

All above Co2 type. fully charged and with horn. Indispensable for small or large planes. Trucks. Auto. Home. Factory. Etc.

RUBBER GOODS

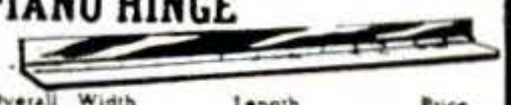
NEOPRENE SHEET RUBBER

	Thickness	approx. Width	rnng.	Price per yd.
#325	.020"	1/64	36"	.75
#328	.032	1/32	22"	$1.39
#329	.125"	1/8"	46"	$4.75

Item #329 is laminated rubber sheet with cloth center. Flexible but very fine for heavy wear.

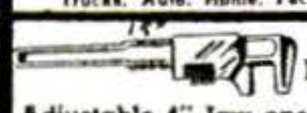
Rubberized Hosp. or Bed Shts. 54"x72". $10.00 Value Only **$2.29**

PIANO HINGE



Overall Width	Length	Price
1¼" (5/8 side)	72" alum.	$1.00 ea.
2" (1" side)	72" alum.	$1.19 ea.
1½" (¾" side)	53" cad. steel	.75 ea.
3½" (1¾" side)	33" steel	$1.00 ea.

15" MONKEY WRENCH



MECHANIC'S

Adjustable 4" Jaw opening. Drop forge Auto. type. Cad. Plated **89c** Blk. **79c**

These Prices Speak for Themselves!

ELECTRIC SOLDERING IRON

110 Volt A. C. Vulcan $8.50 Value

#198 200 Watt **$3.95**

#198A 100 Watt **$2.95**

PALLEY SUPPLY CO. THE LARGEST FIRM OF ITS TYPE IN THE WORLD

DEPT. P.S 5 6321 SAN FERNANDO RD. GLENDALE 1. CALIF.

Order from this Ad. All sales final. All Prices F. O. B Los Angeles. Pay by M. O. or Check. P. O's. Accptd. from D & B firms. 1/3 deposit with C.O.D's.

Copyrighted material

POPULAR SCIENCE Classified Opportunities

Save time—Save Money

Classified Ads only 80c per word per insertion, payable in advance. Minimum ad 10 words. To be included in July issue, copy should be in our office by May 24th. July issue on sale July 1st.

POPULAR SCIENCE MONTHLY—351 FOURTH AVE.—NEW YORK CITY 10

1 AUTOMOBILES

RACING Car Equipment for all cars. Engines. Racing Heads. Manifolds. Carburetors. Mufflers. etc. Speed instructions and literature $1.00—refunded first order. Lee Motorcraft Co., 1412-B Great Northern Bldg.. Chicago 4. Ill.

FROM Speedway to Roadway! Track-proved Hi-speed Heads and Manifolds now available for your passenger car! No special tools needed! Increase horsepower 25%! Astounding getaway! Free illustrated catalog. Speedsport. 6215AB Diversey. Chicago 39.

SEE cur ad under motorscooters for new and used midget car Bargains. Midget Motors Directory. Athens. Ohio.

INDIANAPOLIS Race History Book. All races since 1909. 1100 photos. 340 pages. $3.50. 1948 Race Book $1.50 postpaid. Clymer. Dept. B-500. 1268 So. Alvarado. Los Angeles 6. Calif.

"HOLLYWOOD" Motorboat Tone Mufflers—Singles. all cars $4.85. V-8 Duals $17.50. Satisfaction Guaranteed! Almquist Engineering. Milford 79. Penna.

AUTOMOBILE Racing. Sixth Edition. 100 illustrations. Working drawings with building instructions for Ford-60 midget. California roadster. Offenhauser racer. Details on racer parts. Sample entrance blank. World's record 158.5 M.P.H. rear engine four-wheel drive car. Interesting information for fans. drivers. mechanics. $2.00 postpaid; $2.25 C.O.D. Ray Kuns. Department 62. Cincinnati 27. Ohio.

"SPEED Directory"—Lists all Speed Equipment—Hotrod—Racing Parts Suppliers. Manufacturers. Dealers. Speed Shops. Custom Builders. Wholesalers. Racing Associations. Hotrod Clubs! "Save up to 50%"! Complete money-saving "Buyer's Guide" including "Hotrod Building Information & Speed Equipment Plans"—$1.00. Speed Publications. Drawer 716. Port Jervis 4. New York.

NEW Racing Book. Saga Roaring Road. Complete early United States automobile racing history. Illustrated. $2.00 postpaid. Clymer. Dept. B-SRR. 1268 So. Alvarado. Los Angeles 6. Calif.

"SPEED & Power" Handbook—Very latest methods! Build your own Dual Manifolds. Superchargers. Water Injectors. Hi-Compression Heads. Fuel Saving Devices—easily. Save many dollars! Get racing speed. acceleration. dynamic power increases from any automobile! Build fast Stock Cars! California Roadsters! Hotrods! Get Construction Diagrams! Ingenious Formulas! Speed Secrets! Also "Economy Information"—Mileage Tricks! Conversion Ideas! Tuning Techniques! Picture Catalogues. Plans! Drawings! Including "California Restyling Ideas"—Glossy photographs! Plexi-Tops! Model Revising! Streamlining! Customizing!—$1.98 complete. Newhouse Automotive Industries. 5805-A2 East Beverly. Los Angeles 22.

SPEED Equipment Bargains! "California" Mufflers $4.50. Duals $17.50. V-8 Heads $45.00. Dual Manifolds $9.95. Water Injectors $4.95. Chrome Echo Cans $1.65. Supercharger Stacks $2.98. Lowering Kits $2.95. Chrome Fender Trim 90c. Many Others! Illustrated "Speed Catalog" 25c. Almquist Engineering. Milford 79. Penna.

"VAPO-Steamatic" Water Injector. Easily built! Finest automatic "Moist-Humidity" system. Engineering triumph—Gets up to ten extra miles per gallon! Tremendously increases Horsepower! Eliminates Ping. Carbon. Overheating. Reduces wear--Lengthens engine Life! Copyrighted "Quick-Installation Handbook"—including illustrated Plans. Diagrams. Instructions—$1.00 complete. Newhouse Automotive Industries. 5805-A1 East Beverly. Los Angeles 22.

COMPLETE Details Midget Car Described Page 184 P.S. March. Blueprints. instructions. Photo Technical Data. Transmission. $1.00. J. Kitchen. Caro. Michigan.

NEW Consumers Gasoline Guide Book. Tells 15 ways save gasoline. Describes all octane gasolines. anti-knock fuels. 72 charts. drawings. $1.50 postpaid. Clymer. Dept. B-GG. 1268 So. Alvarado. Los Angeles 6. Calif.

BUICK Parts. We stock a complete line of new Buick parts and engines. Same day service on orders and inquiries. We ship anywhere. Write today. Robertson Buick Co.. 1002 S. Wabash. Chicago 5. Ill.

CALIFORNIA Custom accessory headquarters. Buy direct from original designers and save. Solid hood sides. lowering kits. grille panels. fender skirts. dual pipes. speed equipment. chrome motor accessories. New 1949 catalogue just out. 32 illustrated pages. jam-packed with California accessories—25c. Eastern Auto Supply. 3319D South Grand. Los Angeles 7. Calif.

FAMOUS Car catalog reprints. 1949 Alfa-Romeo. 1949 German Volkswagen. 1949 Italian Maserati Racing and new Sport car. 1949 rear-engined Isotta-Fraschini V-8. Rolls-Royce "Silver Wraith". Dussenberg Supercharged. Mercedes-Benz. Miller Race Cars. Cord. Rayfield Cyclecar. V-8 Chevrolet. Stanley Steamer. Doble Steamer. 1916 Metz friction driven. 1912 Ford. Specify catalog desired. $1.00 each postpaid. Clymer. Dept. B-5X. 1268 So. Alvarado. Los Angeles 6. Calif.

AUTOMOBILE Racing Book. Fifth edition-revised. Tells how to build dirt tracks bodies. frames. engines. Records. superchargers. rules. formulas. plans. stock conversions. roadster racing. fast Fords. $1.00 postpaid. $1.15 C.O.D. Ray Kuns. Department 274. Madisonville. Cincinnati. Ohio.

CUSTOMIZE your car! Authentic California restyling plans galore! Working sketches. specific model changes. Comprehensive; complete! 130 photographs! Largest. finest. or refund! $2 pp. Post Publications. Box 723-BC. Arcadia. Calif.

DUALTONE Crystalline packed California Mufflers for all automobiles; California Chromed Accessories. Lowering Blocks all automobiles. Dual Manifolds. Hi-Compression Heads. Flywheels. Camshafts. Fender Skirts. Plexi-Tops. Send 20c Illustrated Catalogue; Streamlining Manual $2.00. Dualtone Mufflers. 2636B India Street. San Diego 1. Calif.

HOT Rod Book. New. revised. 1946. 1947. 1948 speed record cars. photos. descriptions. $1.50 postpaid. Clymer. Dept. B-5NV. 1268 So. Alvarado. Los Angeles 6. Calif.

"NEW Custom Styling Manual"—(Jumbo Edition!) Shows how to easily make your car look beautifully custom! Latest Restyling. Streamlining. Customizing Methods! Hollywood Sport Changes! Fast model conversions! Jam-Packed with photographs—Illustrations—Drawings! "Hop-Up" Specifications. Complete Restyling information. (Including Custom Car Catalog and Amateurs "Idea Starter" Kit). Everything $2. Almquist Engineering. Milford 79. Pennsylvania.

BREATHTAKING Performance! Build Hot-Rods! Soup-Up Stock Cars! Photographs! Instructions! Only $1.50. Speed and Doll-Up Equipment List $.25. We Pay Freight! Hot-Rod. Box 9626S2. Hollywood 27. Calif.

MODEL "A" Ford Complete Service Manual $1.00. Model T Manual $1.50 postpaid. Clymer. Dept. B-AT. 1268 So. Alvarado. Los Angeles 6. Calif.

DIRECTIONAL Blinkers. cheaply made. easily installed. Complete instructions 35c. Muller. Box 238. Packanack Lake. N. J.

OUTBOARD Book. Complete servicing information all makes. 252 pages. Postpaid $3.50. Clymer. Dept. B-OM. 1268 So. Alvarado. Los Angeles 6. Calif.

MIDGET Racer Plans. Blueprints. Construction data 50c. Sibley. Mendon. Mass.

HOW To Build Racing Automobile. New. revised. Complete information. $2.00 postpaid. Clymer. Dept. B-NRB. 1268 So. Alvarado. Los Angeles 6. Calif.

DUAL Muffler Sets for Ford and Mercury. Famous Power-Tone only $16.95 per set. Power Dual Intake Manifolds for Ford and Mercury (up to 1949 only) $24.95. Immediate delivery. Write for descriptive literature on other Hot-Rod supplies. Certified Welding Co.. Dept. 44-E. Taylor & Delmar. St. Louis 8. Missouri.

HOLLYWOOD Ripple Discs $12.95. Fender Skirts $14.95. Send 25% Balance COD. Free Catalogue. National. 126-A West Washington. Los Angeles. Calif.

AMAZING new "De-Acid Oil Drain Plug" reduces acid corrosion. Saves your motor. Does away with up to 90% of engine wear. Protects vital parts. Acts as neutralizer. Acids attack core of plug rather than motor. Easy to install. Safe. Developed by prominent Diesel engineer. Write at once for this wonderful engine saver. Only $2.50. Money back guarantee. State make and year of car. Johns Manufacturing Company. Dunellen 1. New Jersey.

CLYMER'S New Steam Traction Engine Album. 160 large pages. Just out. 470 photographs. charts. drawings. early advertisements U. S. and foreign makes Steam Engines and Threshing equipment. 105 different makes Steam Engines shown. See Case. Advance. Reeves. Rumley. Avery. Westinghouse. others. from 1855 to 1929. Unique. historical. educational book of real Americana. Postpaid $2.50. DeLuxe Edition Fabrikoid bound $3.50. Clymer. Dept. B-ST. 1268 So. Alvarado. Los Angeles 6. Calif.

BARRONS Guaranteed Radiator Sealer 35c. Barrons Stop Leak 35c. Barrons Clean Post Battery Washers. Stops Corrosion. 35c pair. Westnor Sales Co.. Box 38. Saugatuck. Conn.

Copyrighted material

POPULAR SCIENCE OPPORTUNITIES

"WATER Injection". Free descriptive. illustrative information. Neher Industries. La Verne 6. Calif.

"SPEED & Mileage" Manual—(New. revised!) Easily obtain greater speed. mileage. racing performance from any automobile! Famous authentic book show simplified soup up methods; speed tuning; mileage secrets; speed equipment plans; 125 illustrations—complete instructions on building inexpensive power equipment! Hi-Speed heads! Superchargers! Dual mufflers! Manifolds! "Water Injectors"!—Fast conversions—"Hot Rods"—Custom cars! All about engines. "Economy tuning". Restyling. compression. fuels. "Racing Tricks"! Track Proven Methods! Latest "Hollywood Customizing Information"! Streamlining! Sport Changes! "Money-Saving Speed Conversions"! (Plus) California Roadster Plans! Parts Lists! Speed Catalogues! "Beautiful Pictorial Supplement"! Folios! Photographs! Working Diagrams! Complete Data! Everything $1.98. (Satisfaction Guaranteed). Almquist Engineering. Milford 79. Penna.

"HOTROD Book"—Just Published! Latest speed data for all cars! Shows how to easily construct your own speed equipment—build 145 M.P.H. racers! Hollywood roadsters! Sports cars! Fast street. track conversions! Illustrated "California Customizing"! Body restyling! Motor rebuilding! Speed changes! Tuning! Streamlining! Gives complete hop up information. "Speed Tricks". Fuel formulas. Mileage Tips. "Conversion Plans"—Covers channeling. Multiple carburetion. Water injection. ignition. ratios. porting. balancing. Time trials—Latest California Methods! Equipment Catalogs! Hot Rod Plans! Working Drawings! Photographs! Consultation data! Charts! Graphs! Terrific Book. $2.00. Speed Publications. Drawer 716. Port Jervis 4. New York.

2 AUTO SUPPLIES & EQUIPMENT

AUTO parts for all autos and trucks. Trans. motors. differentials. fenders. carburetors. Also Body Parts. Security Auto and Truck Parts. 1923-PS Grace. Chicago 13.

AUTO parts. Buy direct. Get dealers' prices. Represent us in your territory. Write requirements. Specify car make. Mechanics Auto Parts. Factory Warehouse. 3807-PS N. Ashland. Chicago 13.

BRUSH Plating Outfits connect to a battery. No tanks or shop required. Free particulars. Gunmetal Co., Avenue K. Decatur. Illinois.

USE Toilet Paper For Oil Filter Cartridges. See Ad on Page 38.

YOUR Car runs saw. generator. concrete mixer. $6.50. Illustrated circular. Vise Brake Co., Omaha 5. Nebraska.

WELDING bodies. blocks; repairing fenders boosts your profits. Easy with Hobart Welders. Low cost. Free Catalog. Write Hobartweld. Box P-592. Troy. Ohio.

AUTOMOTIVE Surplus Bargains! Welding. outfits. hones. bearing pullers. sockets. wrenches. also large stock of industrial tools. Catalog free. Glenco Supply. 75-19 Myrtle Ave., Glendale 27. N. Y.

GUARANTEED Auto Radiators. Heavy Duty. Ford "A" 1930-31—$23.00. Ford V8 1936—$37.00. Ford 85 H.P. 1937—$37.00. Ford. 85 H.P. 1938-39—$37.00. Also other models. Any Chev. Pass. 1933-47—$28.00. Radiators for Trucks. Write for Prices. The Ozark Co., 2451 N. Harlem Ave., Chicago, Ill. Send Money Order or Check. F.O.B. Chicago.

POWER-Tone mufflers for all cars. Gives that Power Plus tone. Singles and dual sets for Ford and Mercury. Also the new Power dual intake manifold for Ford and Mercury cars. Many other items. Dealer Inquiries invited. Power Engineering Company. Dept. PS-5. 4506R Delmar. St. Louis 8. Mo.

PISTON Rings—All sizes. oversizes. odd sizes. Individually Engineered sets for every motor and motor condition by leading proving ground testing group. Northwestern Auto Supply. 750 Division. Grand Rapids. Michigan.

OVERHAUL your engine. low as $6.95. quality rings. all gaskets. etc. Save 50% and more. Mechanics Make Extra Profits. Catalog 10c. Guaranteed Auto Parts. P. O. Box 82. Wellington. Ohio.

CHEVROLET Parts. Scarce motor. body. sheet metal parts. Grossman Chevrolet. Minneapolis. Minnesota.

GIDE-Rite. makes night driving a pleasure! Attaches instantly.—any windshield! $1.00 postpaid. Gide-Rite Sales. 13 Condict St.. Jersey City 6. N. J.

BELLS. Solid brass. two chimes. no wiring. $8.50. Details free. Bermuda Auto Bells. D-15. 16 Concord Street. West Hartford 7. Conn.

ELIMINATE Steel Grit. Install Magnetic Plugs in Transmissions. Differentials. Crankcases. Car Sets $1.95. Tractor Sets $1.30. Specify Make. Free Literature. Jacques. Rumson. N. J.

FOR Sale: New. 3 Ton Hein-Werner Hydraulic Jacks. $8.95 each. 5 Ton. $10.95 ea. Paul Lang Auto Parts. Kankakee. Ill.

SKIRTS—big hubcaps—mufflers. and all accessories. best prices. C.O.D. Latest catalogue 25c. Mello-Tone Muffler Shop. 1220 So. Robinson. Oklahoma City. Okla.

OIL Filler. Fords. Mercurys. Saves oil. eliminates fumes. Free folder. Write Metalart Co., 4545A West 190. Redondo Beach. Calif.

MOTORISTS save gasoline by Vacumating overrich mixtures. Fits all cars. For Free particulars write Vacumatic. Dept. 1509. Wauwatosa. Wis.

PISTONS.—All American and Foreign Makes. Racing Types Made. Free price sheets. Merryman Co.. Lawndale. Calif.

HARD-To-Get Auto Body parts? We Supply! Miller Auto Parts Service. 192 N. Clark St.. Chicago.

"AIRFLOW Needles". Save Gasoline. Write for Free Trial! Give Make Car and Carburetor. Neher Industries. La Verne 6. California.

SAVE Gas! Instant starting. "Lektron" atomic coil booster. Only $2.00. Money-back guarantee. Specify car. Electronic Industries. Cleveland 11. Ohio.

3 AUTO TRAILERS

BUILD Your own trailer! Save money! Have every feature you want! Plans for house. sport. camp and utility trailers. Catalog describing 9 models 10c. 15c in Canada and overseas. Jim Dandy. Box 125-B. Wausau. Wisconsin.

PHOTOGRAPHS. plans for 12' Camp and Travel trailer. plus Planner's Guide. $1.00. Ed Christensen. Box 687. Thief River Falls. Minnesota.

4 MOTORCYCLES, BICYCLES, SUPPLIES

MOTORBIKE outfit $5.00; Midget car (complete) $35.00; Indian Motorcycle $30.00; Cushman motorscooter (complete with extra tire) $20.00; 1946 Whizzer $35.00; other motorscooters $10.00 up; motors $3.00 up. Send 25c for new catalog #942 listing many other sensational bargains in used motors. motorscooters. motorcycles. parts. etc. Associated. Box 1764-CS. Toledo. Ohio.

MOTORSCOOTERS. New Design. 6 big features. Literature 10c. Rollaway Motors. Lancaster. N. H.

WHEELS! Build wagons. scooters. mowers. trailers. wheelbarrows. grocery carts. baby carts. play pens. baby carriages. 4" to 16". Free list. Trulsen Mfg. Co., 811 E. 31. Kansas City. Mo.

INDIAN motorcycle $35; Harley $45; Briggs motorbike $25; Cushman motorscooter $9. three wheeled motorscooter $16.50; Springcycle $10. Midget car $15. less motors. Briggs motor $2.50. New motorbike conversions $5. Four balloon tires for motorscooters or midget cars $3. Mail order only. Over 5000 tires in stock. Plenty new midget cars. motorscooters. engines. automatic clutches. transmissions. etc., in stock at factory prices. Send 25c for Big War-Bargain catalogue Number 30 just out listing these and almost 400 other bargains. (35c by First Class Mail.) Midget Motors Directory. Athens. Ohio.

MOTORCYCLE. Scooter & Bicycle Owners. Is your Motor tired? Lost its power? Do you want it to go faster? Cylinders rebored. Porting relieving. Special Valves. Heads milled. Parts and gaskets. Milne Bros.. 1953 E. Colorado. Pasadena. Calif.

WHIZZER Bike-motor $25.00; Cushman motorscooter $15.00; Midget Racer $40.00; Shaw Bicycle-motor $15.00; Harley-Davidson Motorcycle $15.00; Smith Motor-wheel $25.00; Good motorscooter (twist grip) $22.50. Rush 25c for new catalog #14 listing many other amazing bargains in motorscooters. used motors. midget cars. parts. wheels. etc. Gail. 538 Erie. Toledo. Ohio.

RECONDITIONED motorcycles and motors. Chromium accessories. Complete stock Indian parts. Expert rebuilding. Fast service. Indian Motorcycle Sales. Kansas City 1. Mo.

HI-Compression Head Gasket for Whizzer $1.00. Jacco. 587 Shawmut Ave.. New Bedford. Mass.

REVOLUTIONARY new Weber high-compression aluminum cylinder heads for Whizzer motorbikes. Cushman motorscoots and Mustang 'cycles. Increased power . . . greater economy . . . eliminates gasket troubles. Whizzer Head $5.95; Cushman Head $6.95; Mustang Head $9.95. C O.D. or cash with order. Write for catalog page. Dept. S-5. Weber Tool Co.. 4200 Whiteside. Los Angeles 33. California.

JET Propelled Bicycle. Assemble your own. Photo and Instructions $1.00. Rush order. Maupin. Tipp City 6. Ohio.

MOTOR Scooters. bicycle engines. 120 miles gallon. Dime for catalog. Clymer. Desk B-55. 1268 So. Alvarado. Los Angeles 6. Calif.

NEW motorcycle jackets of sturdy black horsehide—$29.95 value for $24.95 postpaid. Similar style in black capeskin. $14.50. Give chest and waist measurements. Devjackets. P. O. Box 3342. St. Paul 1. Minn.

MOTORCYCLE Monthly—Pictures From Everywhere. Year's subscription $1.00. Sample 15c. Motorcycle News. 5424-H Sawyer. Chicago 25.

5 AVIATION

JET Engine: Build the miniature M.E.W. 601. requires only hand tools; Construction Plans $1.00; Parts available; Send 10c for Illustrated Literature & Parts List. Minnesota Engine Works. Dept. PS. 387 University Ave.. St. Paul 3. Minnesota.

PROPELLERS—2-3 Blade. for sleds. air-drive boats. Catalog. Standard Aero Craft. Box 387. Ft. Worth. Texas.

6 AVIATION INSTRUCTION

GUARANTEED: "Ross Questionaires" cover all C.A.A. Ratings. Free Folder. Ross Aero Publishers. Tulsa. Oklahoma.

7 ELECTRICAL SUPPLIES & EQUIPMENT

BUY Lamp Parts Wholesale. Parts you need for building. repairing. or assembling. Save money on large or small orders. New catalog for 10c. Gearon Company. Dept. 300-A5. 27 South Desplaines. Chicago. Illinois.

OIL Lamps—Instructions for electrifying. restoring. Also 44 page illustrated catalog. All Parts—10c. Gyro Lamps. 5402B N. Clark. Chicago 40.

FREE Wholesale Catalog. Electric Motors & Air Compressors. Variety of uses around farms. homes. small plants. Masteraire Compressor Co., 5 Hamilton Street. Newark 2. N. J.

FREE Catalog—Motors. Welders. Welding Supplies. Generators. Home Freezers. Electric Lawn Mowers. many other electrical bargains. LeJay Company. Minneapolis. Minnesota.

NEW Kohler Power Unit; 1500 watts. 60 cycles. 110 volts. Automatic. Sell $485.00. was $690.00. Hodge Radioelectric. Ashtabula. Ohio.

30 AMPERE Continuous duty selenium electroplaters! Write. Lectralabs. Wakefield. Rhode Island.

SEND 25c today for our new home & shop Electrical Equipment Catalogue. hot off press—100 pages. 500 illustrations—Veterans take 10% discount on all merchandise orders. Immediate Delivery. All merchandise in stock. Canal Electric Co.. Dept. C1. N. Y. C. 10. N. Y.

ELECTRIC Pencil: Engraves all Metals $1.25. Beyer Mfg.. 10511-C Springfield. Chicago 43.

Copyrighted material

WATTHOUR Meters, reconditioned, calibrated, guaranteed. All types and sizes. $2.75 up. Write for illustrated bulletin. Maspenock Electric Light Co., Room 502, 44 Starr Lane, Jamaica Plain, Mass.

LAMPS—Build Own Originals. Parts Wholesale, any amounts. Catalogue 10c. Brown Lamp Co., No. 501, Wellston, St. Louis 12, Mo.

LAMP Parts—Fittings—Shades—Wrona Lamp Co., 2012 Cortland Street. Details 10c. Chicago 47.

8 WELDING, SOLDERING, PLATING

WELDERS! New Portable Champion Special Transformer Welder: 110/120 volts, AC 9 heat stages up to 75 amps; Welds, brazes, solders, cuts all metals. Easy to use. Simple instructions. Special Flame Weld Torch Free. Splendid for Shop, Farm, Home repairs. Saves hundreds of dollars yearly. Only $27.50. Also heavier models. 10 Day Free Trial. Magic Welder Co., 239 PS Canal St., New York, N. Y.

PLATING equipment, supplies and chemicals for copper, gold, silver, etc. Ramyr Platers; 10, 30, 50, 100 Amp. Complete silver plating assembly, includes rectifier, tank, anodes, solutions, etc. Full Price $109.50. Complete bronze baby shoe plating assembly $97.50. Instructions free. Send for list. Hollywood Bronze Supply, Plating Div., 1770 N. Vermont, Hollywood 27, Calif.

WELDING training pays. GI approved. Best equipped school in U.S. Free catalog. Write Hobartweld, Box P-594, Troy, Ohio.

"BUILD-Ur-Own" Welder. Portable. Hobart Welder plus auto engine saves $350. Instruction free. Write Hobartweld, Box P-593, Troy, Ohio.

BUILD Your Own D.C. Arc Welder. Up to 300 Amperes. New design, made from surplus materials and Aircraft generator supplies by us. Plans only 35c, including New catalog. LeJay Mfg. Co., 823A LeJay Bldg., Minneapolis 8, Minn.

WAR Surplus 200 Ampere generators $33.00 each. Free literature. Lewis Short, Burrton, Kansas.

WELDERS, 110V, welds ½" steel $32.50. Morris Welding Service, 1850B State, Schenectady 4, N. Y.

WELDER cores 6c cubic inch F.O.B. No C.O.D. E. Noyes, 32328 Brush, Royal Oak, R5 Michigan.

RADIATOR Repairing Books, Supplies, Equipment, Gasoline Torch. Write for circular. Curfman Mfg. Co., Maryville, Mo.

OXY-Acetylene "Demurrage free" Linde cylinders, Purox apparatus, Oxweld supplies, Metalmaster outfits, Miller electric hobby welders, approved fire extinguishers. Free literature. A-A Welding Supply Co., Dept. B, 9228 So. Ada St., Chicago 20, Ill.

10 MACHINERY, TOOLS, SUPPLIES

DRILL GRINDER for twist drills $2.95. See ad on page 278.

AMAZING New Wood-Turning tools, sharpen once in 12 years! Tipped with tungsten carbide. Razorlike edge works free hand equally well in wood, plastic, soft metals. Finest tools available. Write for free literature. Johns Mfg. Corp., Dunellen 2, New Jersey.

"TIRES"—Save ⅓. New, rugged all purpose airplane tires, 10 inches to 56 inches high. Complete wheel assemblies attach tasily to your axles. Free details. Write card today. Airplane Tire Co., Box 1201B, Tulare 2, California.

YOUR own machine shop will save time and money on your repairs. Your neighbors work will pay you $2-$3 per hour. Our surplus machines are accurate, low-priced and delivered at once. Screw-Cutting engine lathes $150 and up. Powerful upright drill presses from $110. Milling machines $150, some higher. Shapers, welders, band saws, grinders. Our guarantee: Satisfaction or your money back. Conversion Parts Co., 277 Adams St., Boston 22, Mass., U. S. A.

LAWN Mower Repairmen free price list rollers, blades, supplies. Vernon Goeller, Mt. Lakes, N. J.

BALL bearing arbors, rugged steel construction. Shaft ½" by 10"; 1½" between collars, $6.95; plain spindle, $6.00, pp. Pillow blocks, ½", $2.95. W. H. Barr Company, Box 336, Tuckahoe, N. Y.

HOME Lathe owners—Build your own attachments. Send for picture, sample of work and list of blueprints. Cut gears, ratchets, etc. Make neat screws easy way. The Home Shop, 415A Raymond Ave., Glendale 1, Calif.

SHEBEL Saw Filer files all saws. Circular. A. P. Shebel, 730 S. 2nd St., Milwaukee 4, Wis.

SURPLUS Machinery, tools, etc. Rush name. Wayne Engineering, Elkins 2, West Virginia.

FIRE extinguishers. 15-lb. C-O-2. $42.50. Domonkos, 98-B5 Vermont, Newark 6, N. J.

WONDER Drill Sharpener. Successful precision grinding simplified. $1.95. Ellery Thompson, Wonder, Oregon.

CARPENTERS. Awkward ripping operations made easy with any power hand saw. Free Literature. Porta-rip-aid, Martin, Michigan.

POWER tools, equipment wholesale prices. Free Bulletin. Homecrafters Cooperative, Grand Rapids 6, Michigan.

13 BATTERIES, GENERATORS, ETC.

COMPLETE Rebuilding Service — Fully Guaranteed — Save Money — Generators, starters, armatures, carburetors. Polaris, 4615 Ravenswood, Chicago, Illinois.

EDISON Non-Acid Storage Batteries for all uses. Fully Guaranteed. Interesting literature. Generating Plants, all makes and sizes at bargain prices. Hawley Smith Co., Croton Falls 2, New York.

14 BOATS, OUTBOARD MOTORS, ETC.

NEW, used, rebuilt marine motors. Marine conversions, fittings. Free Catalog. Stokes Marine Supply, Dept. 23, Coldwater, Mich.

FULL size, cut to shape boat patterns, blueprints, 7½—38 feet. Illustrated "Build a Boat" catalog, 10c (coin). "How to Build Boats" book, $1.00. PolyWog Houseboat Plans $10. Cleveland Boat Blueprint Co., Dept. A-77, Cleveland, Ohio.

BOAT plans, kits—Hardware—Conversions—Plywood—See Marine Mart display ad page 264.

BUILD 8 ft. dinghy. Kit complete with all hardware, Marine Plywood, $45. Free literature. Ideal, 21A West 19 Street, New York 11, N. Y.

KAYAK Construction Kits. Lightweight! Strong! Seaworthy! Speedy! Economical! Literature. Dedham Kayaks, Dedham, Mass.

BOAT Plans: Over 300 designs Easy-To-Build Outboards, Sailboats, Runabouts, Cruisers, etc. Get Free Catalog now. MoToR BoatinG, 572B Madison Avenue, New York 22, N. Y.

INBOARD Hulls, Outboard Runabouts, Hydroplanes, Hunting, fishing boats. Catalog 10c. Huebl Boats, Le Sueur, Minn.

KNOCK Down Boat Kits. Outboards. Inboards. Sail, Racing. Easy to Assemble, Enjoyable. Minimum Cost. Illustrated Catalog 25c. Brooks Boat Company, PS04, Carrollton, Michigan.

STEERING Wheels, windshield brackets, from $6.95. Modern fittings at lowest prices. Complete pre-cut plywood boats. Bargains galore. Folder 10c. Marine, Box 681, Mendota, Minnesota.

MARINE conversions for Ford and Jeep engines. Catalog 10c. Lehman Manufacturing Company, Department A, Newark 2, New Jersey.

BUILD Your Own Boat by the Welch System, Ready Cut Parts. No Experience Necessary. Save 2/3 Cost. Rowboats to Cruisers. Illustrated Catalog 25c. Midwest Boat Company, Menomonee Falls, Wis.

WATERPROOF Plywood—Oak Lumber finished to size—for boat building. Prefabricated Kits—Marine Finishes—Supplies—Books—Plans. Send 25c today for complete literature, details, price lists. Trans-Marco Corporation, Mount Vernon 1, New York.

"AMOT" marine engine thermostat $17.50. Marine starter switch, won't stick $1.75. Marine ignition lock $2.50. Free circular. American Motors, 21 Nevin Ave., Richmond, Calif.

15 ENGINES, MOTORS, ETC.

WINDING Data, listing 225 motors, single and three phase, $1.00. Motor Data, Box 7631, Kansas City 3, Mo.

WELDING Generators, 150 ampere $47.50. ½ Horse, 1750 RPM motors $19.75. ¾ Horse, 3450 RPM $22.50. Compressors $17.50. Butler, 1885 Milwaukee, Chicago.

"BUILD-Ur-Own" Gas Drive Welder. Portable. Get profitable jobs anywhere. Your engine plus Hobart Generator saves $350. Free instruction book. Write Hobartweld, Box P-595, Troy, Ohio.

MOTORS! ½ HP DC converted to AC. All new, High speed 110 volt, 25 or 60 cycle, ball bearing motors. Actual value about $75.00. Now $15.00 each or 3 for $40.00. With forward and reverse switch $19.50, 3 for $50.00. Countless uses for home mechanics. Can be used in any position. Order today! Immediate delivery! No C.O.D. order. "Amazing Bachman's." 27 Herman Street, Rochester 5, New York, Dept. PS.

MOTOR Repair Men, send for free literature on motor testing and winding equipment. Motor Industries, Quincy, Ill.

HOTTEST surplus list in the country. Electronics, Hydraulics, Aircraft, Gadgets. Dick Rose, Everett, Washington.

MOTORS, ½ h.p. 3450 R.P.M. $17.50. 1 h.p. $28. ½ h.p. 1750 R.P.M. $18.50. Roberts, 7232 Madison, Forest Park 1, Ill.

16 AMERICAN POLICE JIU JITSU

DEADLY Judo—Fiercest fighting technique. Trick knockouts. (200 photographs—plus illustrations.) Expert instructions—Three volumes. Complete $2.25. Variety House, Box 46-A, Wall Station, N.Y.C. 5.

18 BODY-BUILDING COURSES

BIG Bargains, 12 Courses $1.00. News 10c. Sid's System, Southgate, California.

HANDBALANCING and acrobatics, self-taught. Write. Power, 932-c W. Vine, Kalamazoo, Michigan.

ACROBATS! Strength, Health. Free Booklet. Write! Ebb, Knoff, Pewaukee, Wisconsin.

BARBELLS, Dumbbells, Exercise equipment, Courses, Free booklet. Good Barbell Co., Reading, Penna.

FREE Catalog . . . Barbells finest quality $8.98 and up. Enclose 10c postage please. Dan Lurie Barbell Company, 1729 Rockaway Parkway, Brooklyn, N. Y., Dept. 150-E.

19 SPORTING GOODS, GUNS, FISHING TACKLE, ARCHERY

180 PAGES antique and modern pistol, sword, etc. values, 50c. Robert Abels, 860½ Lexington Ave., New York 21.

SEND 10c for list 100 used guns. Frayseths, Willmar, Minn.

"SHOTGUNS"—"Rifles"—"Handarms"—"Ammunition"—"Rods"—"Reels"—List 10c. PS-Rudolph's, Atchison, Kansas.

AMMUNITION 175 Sizes in Stock. American, Foreign. Dime for List. Central Sports, Delphos 11, Ohio.

FREE Bargain Catalog! Write Klein's Sporting Goods, Department C, Chicago 6.

5,000 BARGAINS, firearms, binoculars, war relics, catalog 40c. Smith Museum, Runnemede, N. J.

ANGLERS' Almanac tells you when, where, how. Answers more questions on fishing than any other book. Only $1 at your dealer or Anglers' Almanac, Dept. CD-15, 350 Broadway, New York 13, N. Y.

BOWS—Arrows—Quality Archery Equipment. Popular prices. Catalog 10c. Illustrated Archery Instruction Book 50c. Archer, 617-J So. State, Chicago 5.

FREE, new Spring Catalog of Guns, Fishing tackle, Athletic goods, Camping equipment, cameras, Western goods. Write Andy Anderson's Sporting Goods Co., 120 W. Grand, Oklahoma City, Okla.

SURPLUS Camping Supplies. Bargains. Free Catalog. R. McManus, Cuttingsville 5, Vermont.

10 ARROWHEADS $.98. Tomahawk $1.97. Civil War Musket $18.50. Bayonet $.98. Deer horns $3.98. Museum, Wenona 29, Ill.

Copyrighted material

POPULAR SCIENCE OPPORTUNITIES

AMMUNITION. Ammunition. Norma ammunition now being imported, made by expert Swedish craftsmen for all foreign type rifles. Prices reasonable. Write for free catalog. Ashton Company, Seventh Broadway, Los Angeles.

SHUR-Ketch fish lures . . . for bass, blue gill, crappies. You'll get results with Shur-Ketch! Four for $1.50 postpaid! H. J. Weber, 3601 Redding Street, San Gabriel, Calif.

DISPOSING: 400 Firearms, Kentucky Rifles, Pistols, Muskets, Rifles, Blunderbusses, Powder horns, Percussion Caps, Ramrods, Cartridges, 25,000 Relics. New Illustrated Catalog 25c. Heike, Wenona 28, Illinois.

AMMUNITION Mauser, Mannlicher, Norma Bullets, Rifles, Shotguns. Write Free Catalog. Ashton Company, Seventh Broadway, Los Angeles 14, Calif.

TENTS, war surplus, all sizes; cots, hammocks, camping equipment, canvas covers, fishing & sporting goods, rope. Morsan, 10-19D 50th Avenue, Long Island City 1, N. Y.

20 FIELD GLASSES, TELESCOPES, ETC.

TELESCOPES, Binoculars, Microscopes. —big bargain catalog free. Brownscope Company, 24 West 45th Street, New York.

"TERRIFIC" Bargains — Government Surplus Telescopes, Binoculars. Send $1.00 for 10 piece Hobbyist Lens Set. Contains magnifying and reducing lenses. Send stamp for "Bargain" list. H. Jaegers, 93-08 95th Ave., Ozone Park 16, N. Y.

SENSATIONAL Pocket Telescope (pen-size)—6 power, coated precision lenses, $9.95, also Metal Pocket Microscope, 25 X, $3.50. Marshutz Optical Co., Los Angeles 14. (Established 1887), 10 day refund privilege.

REFLECTING Telescopes, completely assembled, 60X, $25.00. Guaranteed Observatory clearness. Free information. Skyscope, 475 Fifth Avenue, New York 17.

POWERFUL astronomical telescope easily made. Perfect lenses and instructions; 100X $3.00; 100X and 200X $4.00; 100X, 200X and 400X $6.00. Full power, clear vision guaranteed. Instructions alone 10c. Suffolk Science Service, Manorville, N. Y.

GIANT astronomical telescope complete with tripod, 100 diameters (10,000 area) magnification, $15.00. Full power, clear vision guaranteed. Suffolk Science Service, Manorville, N. Y.

BINOCULARS. New 6x25 $20.00; 8x30 $30.00; 7x50 $40.00. Plus Tax. Money Back Guarantee. Bushnell Importers, 672 S. Lafayette, Los Angeles 5.

POWERFUL Astronomical Telescope. Equatorial Mounting. Two Eyepieces $16.50. Bluhm Optical Lab., 4213 Gifford Avenue, Cleveland 9, Ohio.

ASTRONOMICAL Telescopes, binoculars, microscopes; Bought, sold, repaired. Books. Lists 10c. Rasmussen-Reece, Amsterdam, New York.

TERRIFIC Binocular Bargain. Lightweight Zeiss design. Equals finest. New 7x50 manufactured occupied Japan under supervision American military Experts. Only $49.50 plus 20% federal tax. Leather case included Free. 10 day money back guarantee. 10% deposit on COD's. Gamerman's, Dept. F-45, 3808 Eastern Avenue, Baltimore 24, Md.

24 DOGS, BIRDS, PETS, RABBITS

SEE Gulf Hamstery ad page 54. Shows picture of Hamster.

$250 MONTHLY. Raising Angora Rabbits. Particulars free. White's Rabbitry, Newark, Ohio.

ANGORAS, Giant Chinchillas, White Giants—World's most profitable rabbits. Finest pedigree, heavy-producing, prize-winners. Literature free. Grinstead's, Edwardsville, Illinois.

GOLDEN Hamsters—Feeding, Housing, Breeding, Selling. 10 Page Mimeographed Folio, 25c. Oregon Hamstery, Portland 19, Oregon.

RAISE Hamsters—profitable. Breeders $5.00 pr.—$7.50 trio. Instructions free. John Robertson, 171 Lambert St., Mobile, Alabama.

RAISE Guinea Pigs. Make money at home. Booklet free. Taylor, Box 426B, Hapeville, Georgia.

LOVELY Golden Great Danes. Companion, Guard. Sidney Baucom, Salt Lake City 3 Utah.

RABBITS! For tasty Food and Profits. Write for information and Free Illustrated Booklet. Dr. Frank Baddour, Lebanon 8, Tenn.

HOBBY Catalog 10c. Reptile Bulletin 5c. Hamsters $2.75 pair; white mice $3.50 dozen, $1.00 pair; alligator $2.50; Chameleon 35c; European lizard 75c. Quivira Specialties, Topeka, Kansas.

25 FROG RAISING

FROG-RAISING—New book explains everything! Broel, 1035 Marlborough, Detroit 15, Michigan.

30 FARMS, OTHER REAL ESTATE

OZARK Lands for All purposes. Actual river frontages. 5 acres $90.00 and upwards. Free list and literature. Hubbard, 424-H, Minnesota Ave., Kansas City 4, Kans.

GOOD FARMS—Ranches. Washington, Minnesota, Montana, Idaho, Oregon, North Dakota. Dependable crops, favorable climate. Write for literature, lists describing typical farm opportunities. Specify which state. J. W. Haw, 120 Northern Pacific Ry., St. Paul 1, Minn.

BIG Lists Farms, Ranches, Water Frontage Properties. Free descriptive folders, prices. Splendid opportunities. Washington, Idaho, Montana, Dakotas, Upper Michigan, Wisconsin, Central Corn Belt. Information regarding Columbia and Missouri River Basin irrigation projects. L. H. Robbins, Milwaukee Railroad, 736M Union Station, Chicago 6, Illinois.

JUST Out Strout's Red Farm Catalog! Spring-Summer Time and Money-Saver—Free! Describes 2790 Bargain Properties—35 States Coast-to-Coast. Write Today for your Free Copy! Strout Realty, 255-ZB—4th Ave., New York 10, N. Y. 20 W. 9th St., Kansas City 6, Mo. 453 S. Spring, Los Angeles 13, Calif.

FIVE Acres near town $300.00, $10.00 down, $10.00 monthly. R. W. Stewart, Inverness, Fla.

FLORIDA Garden Farms, 10-Acres only $595, payable $15 monthly. Splendid location near beautiful Green Hills. Fastest growing Town in Florida. Fine Railway and Bus Service. 28 miles north of Panama City, famous beach and fishing resort. Marvelous year-round climate. High and dry. Grow vegetables, fruits, berries, grapes, pecans, tung nuts, etc. Low building costs. Electricity. Make good money raising broilers. Wonderful fishing, hunting, bathing. Write Today for full information. Owen Ashton Wood, Box 873, Houston, Texas.

31 POULTRY AND SUPPLIES

RAISE turkeys the new way, write for free information explaining how to make up to $3,000.00 in your own backyard, address National Turkey Institute, Dept. 57, Columbus, Kansas.

MAKE up to $2,500 raising Broilers and Fryers the newest way in your backyard or unused farm buildings. Write for free booklet. National Broiler Institute, Dept. 4, Versailles, Missouri.

32 PROFITABLE OCCUPATIONS

$40.00 WEEKLY. Made growing mushrooms. Fresh, Dried. Dominion Patent 331,583, free spawn. North American, 169Y Yonge, Toronto, Canada.

NO selling, operate coin machines, amazing profits, details Free. Parkway Corporation, Dept. 12, 623 W. North Avenue, Baltimore 17, Maryland.

ANNOUNCING home study course in commercial baking. Practical basic training. Good field for those with aptitude. Nearly depression proof. Send for Free booklet, "Opportunities in the Baking Industry." National Baking School, 1315 Michigan Ave., Dept. 1721, Chicago 5, Ill.

LOCKSMITHING secrets! Key fitting, lock repairing, opening; prices, sources. Illustrated book $1.00. Wechsler, 7 West 36, New York City.

$5000 FROM half acre growing Ginseng, crop bought. Particulars 10c. Associated Growers, 1169 Corydon, Winnipeg, Canada.

SENSATIONAL! It's easy to earn big money with your own profitable business. Earn $10.00 to $50.00 a day. Make lamps at home. General illustrated course teaches you quickly. Course and wholesale supply catalog only $2.00. Gearon Company, Dept. 200-A5, 27 South Desplaines, Chicago, Ill.

MAKE Charming Chenille Holiday Flowers. Wonderful home business, pays excellent profits. Literature free. Velva Artcrafts, 324-X East 14, New York 3, N. Y.

SELL Auto Seat Covers at factory prices. Every car owner a prospect, big profits. Write National Process, Hempstead, Long Island.

MAKE money with hamsters. New Tiny animal. Easily raised at home. Write for details. Hudson Hamstery, Newfoundland 2, N. J.

WHOLESALE Prices—Electrical Appliances, Radios, Jewelry, Luggage, etc. Crown, P. O. Box 224, Southbridge, Mass.

MUSHROOMS Grown. Manureless process $2.00. Gordons, 553 William, Winnipeg, Manitoba.

EXTRA cash taking magazine subscriptions. Wholesale price list #12 Free. General Circulation Co., Inc., 1011 Chestnut St., Phila. 7, Pa.

$46 FROM Square Foot Plywood. Jigsaw necessary. Write. Woodarts, X-41, Bridgewater, Mass.

33 BOOKS, PERIODICALS, ETC.

MAGAZINES (back dated)—foreign, domestic, arts. Books, booklets, subscriptions, pin-ups, etc. Catalog 10c. (refunded). Cicerone's, 863 First Ave., New York 17, New York.

"ADULT Stories." 25c. Five—$1.00! Free catalogs! Hirsch, Spring Valley 3, New York.

USED Correspondence Courses and Books bought, sold, rented and exchanged. Catalog Free. Lee Mountain, Pisgah, Alabama.

QUICK profits taking magazine subscriptions, handling greeting cards. Cassell Publishers Service, Westfield, N. J.

BOOKHUNTERS! All Subjects. Send Wants! Jaher Book Service, 620-K East 178 Street, New York 57.

FANTASTIC Fiction! Sample, $1.00. Catalogs, 10c (Refunded). Stone, Lunenburg 27, Mass.

RARE, unusual adult books. Catalog 25c, refunded first order. Bruce Books, Box 272-P, Cooper Station, N. Y. 3.

BACK number magazines reasonable. Reedmor, 240 East 9th, New York, N. Y.

MEN—Cartoon Booklets. Adult Humor Illustrated as you like it. Ten for $1.00. Stellar Sales, Dept. E, Box 3353, Merchandise Mart, Chicago 54, Ill.

ADULTS Only "Daring Books." Free literature. Home Pix, 1674 Broadway, New York 19.

"HOW To Use Your Subconscious Powers—A Guide To The Wonders Of Self-Hypnosis". Amazing new book! Money back if not delighted. $2.00 postpaid. Psyche, 542-BF 5th Ave., N. Y. 19.

ADULT Books—Arts, Novelties, Illustrated Comic Booklets 10 $1.00. Catalogues 10c. Kogan, 1032-SA, Church Annex, New York 8.

8 PAGERS The vestpocket comic booklets that men like. 15 for $1 cash no refund or c.o.d., sent in plain wrapper. T. W. T. Books, Box 5033, Chicago, Ill.

"TRUTH About Self-Hypnosis." This booklet reveals facts! $1.00. Hampton, 1617-B Westerly Terrace, Los Angeles (26), California.

NATIONAL Geographic Magazines 1888-1949, any issue. Periodical Service, Box 327-PS, Swarthmore, Pa.

OUT of print books found quickly. Send wants, no obligation. Coast Bookfinders, Box 8686, Los Angeles 46, Calif.

EXPLANATION of Atomic Bomb's Astonishing Force. Read "Gravitation And Atomic Bomb", by A. Donworth, Sc. B., $1 copy. William-Frederick Press, 313 West 35 Street, New York 1.

Copyrighted material

20 ASSORTED comic books, coverless but brand new only $1.00. (Add 15c west of the Mississippi.) Comics, Box 69F, Morris Heights Station, New York 53, New York.

BACK-date Magazines. Specific issues; years. Arkell's, Tarzana 2, Calif.

35 MAGIC TRICKS, PUZZLES, ETC.

MAGICIANS', Gamblers' secrets exposed. Cards, Dice, Punchboards, Slot Machine. Catalog 15c. Book Co., Box 671, St. Louis 1, Mo.

FREE Dollar Magic Set with Professional Catalog 25c! "Mysto," 4462-PS Germantown, Philadelphia.

ITCHING, Sneezing Powders, Eighteen Other Tricks and Joker's Catalog 25c. 2404N15, Philadelphia.

"VENTRILLO," Professional Voice-throwing Instrument and Catalog 25c. Box 971-PS, Philadelphia.

WE supply every noted magician. Large professional catalog 50c. Holden's, P220 West 42nd Street, New York.

JOKERS Novelties, Handshakers, squirters, whoopee cushions, table jokes. 5c brings Catalog. Jokertrix, Box 274, Dallas, Texas.

VANISHING Quarter trick and catalog 25c. Sterling Magic Co., Royal Oak, Mich.

500 TRICKS, new 1949 edition. Send 10c for Douglas famous Catalog showing best in good magic, lowest prices, fastest same-day service. 30 years in business. Douglas Magicland, Dept. 2, Dallas, Texas.

LEARN magic, Ventriloquism, Mind-reading. Write for particulars. Quackenbuch, Big Flats, N. Y.

400-PAGE Catalogue of 2000 Tricks, pocket, parlor, stage. World's Finest Magic. Send $1.00 for Catalogue (refunded first $5.00 order). Kanter's, S-1311 Walnut, Philadelphia 7.

DECK Trick Cards Free with catalog 25c. 12-PS Churchlane, Philadelphia.

AMAZING Trick Disappearing Watch. Vanishes mysteriously from open hand, given with great magic catalog over 400 tricks that astonish, amuse and confuse, only 25c. The Magician, 2463 S. Kensington Avenue, Philadelphia 25, Pennsylvania.

MAGIC Tricks, Jokes, Dice, Books, Cards, Etc. List 10c. Behnke Sales, 5721 Leland, Chicago 30, Illinois.

BE a Magician. Large professional magic catalog of latest tricks, 35c. Ireland, F-109 North Dearborn, Chicago.

FREE Trick With Illustrated Magic Catalogue, 25c. Hall Magic, 345 John R, Detroit 26, Michigan.

HYPNOTISM! 25 Lesson Course, $1.00. Monarch, 38-S Jefferson, Auburn, New York.

LARGE 160 Page Magic Catalog 35c for Beginners and Professionals. Chicago Magic Company, 2300-N No. Mason Avenue, Chicago 39.

FREE Catalogue Magic Tricks & Novelties. Laramie Sales, 4800 S. Laramie Avenue, Chicago 38, Illinois.

HYPNOTIZE! Control the minds and actions of others! Completely illustrated course $1.00. Money Back guarantee. Fowler, Box 1284, Boston 4, Mass.

36 GAMES, ENTERTAINMENT

HOME Model Slot Machines, Games, Home Bars. Send for wholesale catalog. Webb Distributing Co., 4966 West Chicago Ave., Chicago 51, Ill.

BOOMERANG Flying Kit. Seven patented boomerangs fold to pocket size. $1.00 postpaid. Nockonwood Industries, Bloomfield, Iowa.

37 COIN COLLECTING

GET profit and pleasure in collecting old coins. Send 10c for 56 page illustrated coin catalog. You'll be delighted with it. Send for it now. B. Max Mehl, 374 Mehl Bldg., Ft. Worth, Texas. Largest rare coin establishment in U. S. Established 48 years.

FREE! Foreign coin, banknote and Coin Collectors' Illustrated Catalog to approval service applicants. Send 3c postage. Tatham Coin Co., Springfield-D50, Mass.

U.S. coins lowest prices. Send stamp for lists. Hutchinson, 3463 I Street, Philadelphia 34, Penna.

OLD Money Wanted. Do you know that Coin Collectors pay up to $100.00 for certain U. S. Cents? And high premiums for all rare coins? We buy all kinds. Send 4c for Large Coin Folder. May mean much profit to you. Nuismatic Co., Dept. 30, Fort Worth, Texas.

$2.00 TO $200.00 Each paid for hundreds of Old or Odd Coins. Indian-Lincoln-Foreign wanted. Keep all until posted. Send 20 cents for Illustrated Coin Value Book, 4x6. Guaranteed Prices. 40 Years in business. Coin Exchange (1), Le Roy, N. Y.

COMMEMORATIVE $½ — Columbus, Washington, Cleveland, Stone Mountain, $1.50 ea. Illustrated Catalogue 25c. Norman Schultz, Salt Lake 9, Utah.

BARGAINS! Large Cent before 1857, White Indian Cent, 1890 Cent, 1909 VDB Cent, 1923-S Cent, 2c Piece, 3c Piece, 1883 Nickel, 1913 Nickel, Foreign Coin, Foreign Bill and our complete Buying and Selling Catalogue all for $1.00. Catalogue alone 25c. 40 Different Indian Cents $3.00, 25—$1.00. 15 Different Large Cents $3.00, 40—$10.00. Worthycoin Corporation, 294 Washington (D-110), Boston, Mass.

100 DIFFERENT Foreign coins $3.95. 3-legged buffalo nickel $1.25. 1932-D quarter $1.00. 1932-S quarter $1.00. 4 Whitman coin albums $1.00, type album $1.00, handbook 75c. 255 page guidebook $1.50. Big bargain catalogue 15c. Bebee Coin Co., 1180 East 63rd, Chicago 37, Ill.

40 STAMP COLLECTING

DEALER'S Wholesale Catalog. Postage 3c. Franksco, 5031 Queensbury, Baltimore, Maryland.

ZOWIE-E-E! A Barrel of Fun for only a Dime! 500 United States Stamps—Absolutely unpicked and unsorted, just as received from church missions. Many varieties, including large commemoratives, airmails, high denominations up to $5.00! Stampdom's biggest package of fun, and you might find something really valuable!! Price only 10c to serious approval service applicants. Money back if not delighted. Illustrated bargain lists with each order. Mystic Stamp Co., Dept. 55, Camden, New York.

NICARAGUA "Tin Pan Alley" Diamond, Ecuador showing George Washington, and American Flag in natural colors, Fezzan, Trieste, "American Army" stamp First U.S. Commemorative, $100.00 Shanghai, Corsica, Anzac, Antique, others all 5c approvals. Capital Stamp Co., Dept. 10, Little Rock, Ark.

FREE—Famous Americans set, plus Flag set, plus the National Parks set, plus the Presidential set to the $5. A total of 90 stamps absolutely free to customers for our unsurpassed United States or Foreign selection. Send 3c postage for 15 of the above mentioned stamps and full particulars. Triboro Stamp Company, 145 Nassau Street, Dept. 205, New York.

FREE! Crystal-Mount Sample. Harrisco, 204 Transit Bldg., Boston, Mass.

300 DIFFERENT given free with approvals. Postage 3c. Windsor Stamps, 1435 E. 67th Place, Chicago 37.

UNITED STATES approvals complete coverage fine quality, attractive prices. Seminole Stamps, Box 1138-S, Coral Gables, Florida.

200 BRITISH Empire Stamps—only 3c! Kenmore Stamp Co., Arlington 74S, Mass. Free—Illustrated Catalog! Kenmore Stamp Co., Arlington 74S, Mass.

128-PAGE United States Catalog. 1,000 illustrations. 10c. Harris & Co., 204 Transit Bldg., Boston.

WORLD'S Largest Stamp (7½ x 14 inches). A real curiosity! Retails for 50c, only 3c to approval applicants. Tatham Stamp Co., Springfield 50, Mass.

200 DIFFERENT, including Roosevelt triangle, 5c to approval applicants. S. Avalon Stamp Co., Springfield, Mass.

A WORLD of Stamps for 10c. 19th Century U.S., Pictorials, Air Mails, British Colonies, etc., to new approval applicants; also a fine approval selection included. Send 10c today to Cosmopolitan Stamp Co., 1457 Broadway, N. Y. C.

POUND stamps containing thousands $1.00. Longacre Shop, 100c West 42nd, New York City 18.

FREE. Irish Commemorative Collection, Many Colorful Issues. Approvals Sent. Raymax, 123-X William St., N. Y. C. 7.

55 DIFFERENT United States—5c. 8 Different U. S. Cacheted First Day Covers $1.00. Approvals. Utechts, 1143-A North Keeler, Chicago 51.

U. S. 797 SPA Sheet only 5c to applicants for U. S. approvals. M. Haycock, 333—86th St., Brooklyn, N. Y.

FREE! Liberia Triangle Airmail Set, Approvals. Greenwood, 263 Meridian, Miami Beach, Florida.

FREE! United States Stamps nearly 100 years old to applicants U. S. approvals. Wakonda, 140-F Nassau, New York City 7.

200 DIFFERENT Stamps 3c to Approval Buyers. Littleton Stampco, Littleton 92, New Hampshire.

WOW! $10.00 Worth Of Fun 10c! What a treasure hunt! Big package 500 Foreign Stamps, including airmails, pictorials and others from the world over; stamps worth up to 25c each. This offer sent for 10c to Approval Applicants Only. Jamestown Stamp Co., Dept. 5, Jamestown, New York.

FREE! $1—$2—$5 United States Stamps to Applicants U. S. Approvals. Metropolitan, 140-A Nassau, New York City 7.

UNITED STATES Commemorative Collection. Thirty-seven different mint, including Columbians, Bicentennials, National Parks, Famous Americans. Price $1.03 to Approval applicants only. Fort Orange Stamp Company, Albany 1, N. Y.

25 DIFFERENT India—3c with approvals. Premium with purchases. Brandwein Stamp Co., Box 92-P, Bayonne, N. J.

FREE! Complete Balkan aviation set with approvals. Beaman, Leeds 10, Ala.

FREE! Tiny Chinese "Midget" War set. Approvals. Seminole, Leeds 10, Ala.

FREE! Negro Triangle; Turks Islands "Cactus"; Dakar, Guinea; Palestine; "Fairy Tale". Pirate Chart, Ship, Sea Lion, Snake Stamps; French, British, Portuguese Colonies, etc. Free for 3c postage. Approvals. Potomac Stampco, Washington 10, D. C.

LION Triangle, Biggest Diamond, San Marino showing First American stamp, Canal Zone, Constantine, Rheinland, and 26 Different Others—All 5c. Approvals. Grayson Stamps, Sherman, Texas.

FREE—200 Old Issues, etc! Foreign Approvals. National, Box 326B, Passaic, N. J.

POSITIVELY Greatest Free Offer—Rare Octagonal (eight sided) stamp, gorgeous diamond, giant triangle, also mammoth and midget stamps, total value $2.00. All Free to foreign approval buyers. Plus Free, Scott's International $6.00 album and latest Scott Stamp Catalogues. Odd Stamps, Santa Ana, California.

FREE Triangle Roosevelt, Vatican, Ethiopia, Hitler Heads. Request Approvals. Florida Stamp Company, Box 807, Miami 5, Florida.

SIX Triangles 3c! Ask for new type approvals. Bob Harris, 1308 E. Rio Grande, El Paso 4, Texas.

BEAUTIFULLY Illustrated U. S. Bargain Catalog. Send Postage. Paramount 116s Nassau, New York 7, N. Y.

STAMPS 100 Years old. Every collector should have at least a few stamps nearly 100 years old. Although hard to get, we offer a wonderful selection of ten old 19th century foreign stamps and also the blue re-issue of the 100 year old first U.S. stamp, the famous 5c Franklin. All for only 10c. Kindly state whether approvals shall consist of U.S. or foreign stamps or both. Globus Stamp Company, 268 Fourth Avenue, Dept. 222, New York 10, N. Y.

25 DIFFERENT stamps 10c. F. Tunis, Wakeman Ave., Newark 4, N. J.

WORLDWIDE Different: 200—25c; 500—50c; 1000—$1.25; 2000—$3.00; 5000—$15.00. Beacon Sales, Maynard 3, Mass.

15,000 Different Stamps 2c Each! Gordon Davison, Box 1019A, Manchester, N. H.

Copyrighted material

POPULAR SCIENCE OPPORTUNITIES

75 STAMPS from 75 countries 10c to approval applicants only. Bjorn Nielsen. Monmouth 1. Maine.

AIRMAIL packet. Big Bargain. With approvals only 5c. Arthur Wirth. Norwichtown 2. Conn.

10 U. S. Over 40 years Old 5c Approvals. Scott. Middle St.. Lexington. Mass.. 73.

50.000 STAMP Grabbags 25c each. Anderson. 630 Bingaman. Reading 2. Pa.

307 ALL Different 10c. You will find scores of new varieties here for your collection! Big and little stamps. bisected stamp. Commemoratives. triangles. High values! Bicolored Beauties! Strange countries! Every stamp is different. All for only 10c to approval applicants. Write today and receive special Ionian Island stamp extra. Garcelon Stamp Company. Box 418. Calais. Maine.

OLD. scarce U. S. seconds on approval. Slightly defective. bargain prices. Hearnfeld. Clintonhill Station. Newark 8. N. J.

FREE Copy New Interesting Stamp Newspaper. Southern Philatelist. Miami 42. Florida.

FREE. 12 different U. S., Approvals accompany. Village Stamps. 90-39A 214 St.. Queens Village 8. New York.

50 DIFFERENT United States 10c. Price list free. Seidenberg. Cassopolis. Michigan.

FLAG Stamp Free With U.S. Approvals. E. Wenigman. 1933 Patterson. Chicago.

FREE! U. S. Monthly Lists. Fine Stamps! Cole. 43-G Rinewalt. Buffalo 21. New York.

FREE! Unusual Illustrated Lists. Littleton Stampco. Box 66. Littleton. New Hampshire.

500 DIFFERENT worldwide given customers buying my approvals. Aletalo. Maynard. Mass.

$5.00 CATALOG Price For 10c. (1) Big collection 112 all different stamps from Africa. South America. South Sea Islands. (2) Four desirable unused U. S. cataloging 40c. (3) Fine packet 25 British Colonies—Burma. Solomon Islands. etc. (4) U. S. $5.00 high value. Everything (all four items) only 10c with approvals. Crystal. Littleton 40. N. H.

FREE! Asia. Africa. Europe Packet. Approvals. Standard. Box 43. West Farms. New York 60. New York.

100 DIFFERENT—Oriental Countries—10c. Box 6618. Northeast. Kansas City. Mo.

ABSOLUTELY Free—Gilbert Ellice. Cook Islands. Tonga. Seycelles. Ascensions—free to approval applicants. Viking. 130-P Clinton Street. Brooklyn. New York.

WORLD'S Most Attractive Stamps! Foreign. Illustrated bulletin. Donner. Box 643. Ann Arbor. Michigan.

FREE! Illustrated United States Catalog. Low Prices! Americo. Bristol. Conn.

FREE! Sample Popular Traders Book. Economy. Littleton 3. New Hampshire.

2.000 DIFFERENT Stamps Free to Approval Buyers. Bryan. Box 301. Long Beach. Calif.

EXOTIC Pictorial Collection:—Sakalava Chieftain. Fezzan Ghadames. Djibouti. Togoland. Reunion. Andorra. Algeria. Miquelon. Tunisia. Monaco. Guadeloupe. Martinique. Many others. Everything 5c. Imperial Stampco. Tampa. Florida.

FREE! China Navigation Issue with Foreign Approvals. Modern Stampco. Box 12A. Wakefield Station. N. Y.

MOZAMBIQUE Triangulars. unused. Set 10c with approvals. Vargo Stamps. 6044 South Fairfield. Chicago 29. Illinois.

FREE U. S. price catalogue for stamps. albums. supplies. Stone. Box 52-S. Dorchester 24. Mass.

CARLINS Approval Service. Box 307. Fresno. Calif. 50 different stamps 5c to new customers.

TREMENDOUS Bargain—2000 Foreign Stamps $1.00. 5000 $2.00; 2000 U.S. Stamps $1.00. 5000 $2.00. Standard Products Co.. Atlantic Building. Washington 4. D. C.

BERLIN Bears. Complete set of eight and 100 different stamps only 10c to approval applicants. Reich Stamp Co., 4647 Kenmore. Chicago 40. Ill.

FREE! 50 stamps. 3c postage brings yours. Sibley. Mendon. Mass.

$1.00. $2.00. $5.00 United States Free. Approval Applicants. Flamingo. Box 4038. Miami 38. Florida.

DENMARK—25 different sent to approval applicants enclosing 3 cents postage. G. D. Durden. Box 846. Orlando. Fla.

GENUINE "Goya Nude" set 10c (Catalogs 55c). Approvals. Royal Stamp Company. Tamaqua 2. Pa.

$2.000.000.00 CHINA Stamp. Send 10c. Premiums — approval buyers! Crown Stamps. Hudson. Ohio.

FREE! Fifteen Different Switzerlands to approval applicants. Stamp Chest. Box 164. Teaneck. N. J.

42 HOBBIES, COLLECTIONS

INVENTING can be an interesting and profitable hobby. Write for complete particulars. Institute of American Inventors. Dept. 30-E. 2926-Eye St.. N. W.. Washington 6. D. C.

50 DIFFERENT army embroidered patches $1. Other bargains. Insignia Mart. 703B Broadway. New York 3. New York.

UNUSED matchbook covers—100 different $1.00—Catalog 10c—Charles Edelman. 1311P East 84. Cleveland 3. Ohio.

HYPNOTISM As A Hobby—Send 50c for interesting. instructive Booklet. Brown. Seaview Ave.. Swansea. Mass.

VENEER six foreign woods $1.00. Letter size. Inlays. Collections. Special Orders. Box 801. Portsmouth. Virginia.

44 ANTIQUES, RELICS, INDIAN GOODS

ANTIQUES—Relics—Indian Goods. Selling:—350 Historical Firearms:—22.000 Indian Relics. Coins. Kentucky Rifles. Confederate Currency. Gold Dollars. Muskets. Cartridges. Agates. Flintlocks. Pistols. Swords. Rifles. Arrowheads. Tomahawks. Gempoints. Bannerstones. Ramrods. Powder Horns. Steer horns. Bullet Molds. Blunderbusses. Spearheads. Bayonetes. Percussion Caps. Mounted Birds. New Illustrated catalog #13—25c. Heike. Wenona 29. Ill.

46 MINERALS & PRECIOUS STONES

BEAUTIFUL Australian opals—Five dollars. specimens 50 cents. Woodrow Oldfield. 22 Russell Street. Drummoyne. Sydney. Australia.

GEMS. precious and semi-precious. all genuine from world wide sources. Deal direct. no overhead. save money. Catalog 10c. Hill Co.. Route 7-K. Salem. Oregon.

ZIRCONS. Alexandrites. Rubies. others. Direct importation guarantees best quality; lowest prices. 3 Sparkling. polished Zircons totaling over 2 carats $4.00. Catalog 10c. Imhusex. Box 232. White Plains. N. Y. Agents Wanted.

ATOMIC Bomb Uranium Ores: (U.S. Only) Pitchblende. Carnotite. Autunite. Uranium salts. Uranium agate. five specimens $3.50 postpaid. 96 page Uranium Handbook $2.00. both for $5.00 postpaid. TX-6 Geiger Counter $100.00. Hill Co.. Route 7. Salem. Oregon.

47 CAMERAS, PHOTO SUPPLIES

OPERATE your own Photographic Business. Details free! Peace Products Company. Dept. 601. 152 West 42nd St., New York City.

WRITE—Wire Paul Wolfe. 167 Canal St.. N. Y. C. 13. N. Y., for anything Photographic.

HYPO Users Attention! If you use one quart or 100 gals. of Hypo—you can make money by reclaiming the Silver from your old Hypo—through our new principle Silver Reclaiming Process. We buy old film. precious metal scraps. salts and sludges. Dept. PM. Gopher Laboratory. 19P No. Washington Ave.. Minneapolis 1. Minn.

PANCHROMATIC Movie Film 25' 8-8 mm $1.45. 16 mm 50' magazine $2.25. 100' $3.45. Processing included. Doan. 18099 Hamburg. Detroit 5. Michigan.

ART Films for Artists. 100 ft. 16mm $6.00. 100 ft. 8mm $5.50. Send for Free List. Novelty Film Co.. 115 Valley Street. Providence. R. I.

BASS Says: Bargaingram 257 ready and waiting for you. The book which tells all . . . the finest in new and used camera equipment. a veritable encyclopedia. Write. phone or call the sign of the old "Horse Trader". 39th year of satisfaction or your money back dealing. Bass buys. sells and trades. Bass Camera Company. Dept. AG. 179 W. Madison St.. Chicago 2.

WHY Sit And Dream When You Can See It On The Screen. Send for Free List. Providence Film Exchange. P. O. Box 157. Olneyville Station. Providence. R. I.

48 PHOTO FINISHING

OIL coloring photographs can be a fascinating hobby or profitable sideline for those with artistic talent. Learn at home. Easy simplified method. Send for free booklet. National Photo Coloring School. 1315 Michigan. Dept. 1721. Chicago 5. Ill.

THREE prints each 8 exposure roll 40c. Two each 35c. One each 25c. Reprints 3c. L. A. Eastman. Bode. Iowa.

8 PRINTS all enlarged to nearly postcard size from your roll or negative 25c; 16—50c. (Trial offer) Willard Studios. Box 3535G. Cleveland. Ohio.

8 BEAUTIFUL Double Size pictures and roll developed 30c. 8 hour service. Free Mailers. Pacific Photo Service. Box 666. San Francisco. Calif.

35MM FILMS Developed each exposure enlarged to 3¼ x 4½ Deckle-Edge Lifetime enlargements. Finest quality. Satisfaction guaranteed. 36 ex. $1.25. 20 ex. 75c. Free mailers. May's Studios. Dept. L-59. La Crosse. Wisconsin.

FILMS Developed and Enlarged Double Size. 8 exposures only 30 cents—12 exposures 45 cents—16 exposures 60 cents. Prompt Service. Mailing envelopes on request. Real Fotos. P. O. Box 172. Station B. Brooklyn. N. Y.

BEAUTIFUL Enlargements from your rolls or negatives 3c each. (Trial offer). Gorek's. 3619 E. 131 St.. Dept. PS. Cleveland. Ohio.

2 BEAUTIFUL Hi-Gloss prints each good negative and enlarging coupon with each 6 or 8 exposure roll developed 28c. Owlphoto Co.. Weatherford. Oklahoma.

16 ENLARGED. Jumbo. oversize deckled prints from any 6-8-12-16-20 or 36 exposure roll film developed only 35c and this ad. Electronically exposed. Enlargement coupon free. Skrudland. 6444-W Diversey. Chicago.

GUARANTEED repairing on Foreign and American cameras since 1935. Bellows $1.75 up; installed $2.75 up. Fast Service. Reasonable prices. Write for estimates. Willman Camera Service. 3222 North 21 Place. Phoenix 1. Arizona.

8 PRINTS and 2—5x7 or 1—8x10 35c. Reprint 3c. 8x10 Enlargements from negatives or one picture. 3 for $1.00. Free mailers. Speed Photo. Box 822. G.P.O.. New York 1. N. Y.

EXTRA-Heavy Velvet Finish Prints—60c. 8 exposure roll custom developed. carefully hand printed on beautiful National velour paper. Reprints 6c. Satisfaction guaranteed. National Photo Laboratories. New Hyde Park 29. New York.

35 MM ROLLS Developed—Enlarged 3½x5 Prints. 36 exposures $1.00. 20 exposures 65c. 8 exposure rolls developed. printed oversize 30c. 12 exposures 45c. 16 exposures 55c. MacDonald's Photos. Box 228-C. Congress Park. Illinois.

51 MOTION PICTURES, SOUND EQUIPMENT

8-16MM. Silent-sound films. Complete rental library. All latest subjects. Free catalogue. (sample film 10c). Garden Film. 317 West 50th. New York 19.

HOLLYWOOD films. Kodachrome sample. $1.00 (refunded). Catalogs 10c (refunded). Stone. Lunenburg 10. Mass.

UNUSUAL 8-16mm. Film Subjects. Kodachrome projection length sample "Allure". $1.00. Art slides. sample 40c. Films exchanged. Big catalog. 25c; refunded first order. National Film Supply. Broadway Sta. (E). Toledo 9. Ohio.

"THE World's Greatest Passionplay." State Projector. 16mm. & 35MM. Sound & Silent. Hemenway Film. 33G Melrose St.. Boston 16. Mass.

Copyrighted material

POPULAR SCIENCE OPPORTUNITIES

LOWEST Prices. Raw Film 8MM-16MM Free List. MK Photo, 451 Continental, Detroit 14, Michigan.

GUARANTEED fresh anti-halo outdoor movie film! Weston 12! Daylight loading! Processing free! Three spools double 8mm. $3.45! Six single 8mm for Univex. $4.60! Postpaid! Catalog. Filmcraft, 47th Holly. Kansas City 2, Missouri.

BASS Says: 39 years of leadership guarantees satisfaction. Finest Cine equipment. 8mm., 16mm., and 35mm., silent and sound. Write the old "Horse Trader". Satisfaction or your money back always! Bass Camera Company. Dept. A., 179 W. Madison St., Chicago 2.

TITLE Making, free booklet. Westwood Sales. 635 South Victoria Street. San Francisco. Calif.

16mm MAGAZINES—Eastman Super X —Guaranteed—$2.50 each postpaid. Free Processing. Buy 5 get 1 Free. Ask for catalog. Superior Bulk Film Co., 105-A So. Wells St., Chicago 6, Ill.

85 KODACHROME movies! War. Atom Bomb. Travel. Air. National Parks. Beautiful Models. Catalog. 3c stamp. 2 scene "Waikiki" sample. $1.00. Specify 8mm. or 16mm. World In Color Productions. Elmira. N. Y.

MASTERPIECE Art Slides in beautiful, natural colors. Send 50c for sample. catalog and volume price list. Zal Studios. 241 Lafayette St., N. Y. C. 12.

BENEFIT'S Strip-O-Slides now available. Needed by every artist. 25 Art Studies in life-like color. on 35 mm Film Strip complete with 25 readymounts. Only $2.95 postpaid. (Add 10c for first class mail!) Series 1, 2, 3, 4 now available. Or send $1.00 for 5 sample poses and plastic readymount or 25c for single sample. Illustrated catalog included. Extra Special Viewer for $1.50 when ordered with Strip-O-Slides. Benefit Corporation. Dept. A-55. 3807 Benefit Street. Baltimore 24. Maryland.

HOLLYWOOD Produced Films. Glamorous Samples. 8 mm $3.00. 16 mm $7.50. SOF $10.00 including illustrated brochure. List 25c Deductible first order. Dealers' lists free. Filmettes. Box 126c. Toluka Lake Station. No. Hollywood. Calif.

ELECTRIC Movie Cameras. 16mm Army GSAP. original condition. value $200. complete with f3.5 lens—New $32.50; used $19.50. Accessories available for home conversion. Free details! Completely converted Lektro 16mm. ready-to-operate $49.50. guaranteed. Magazine film for same $3.50 includes processing. Thousands of Camera. Projector and photo equipment specials—write for Special Bargain Listings. Fotoshop. Room 507. 18 East 42nd Street. New York City.

KODAK Super-X Movie Film—surplus but tested and guaranteed 'good as gold!' 16mm 100-ft. $3.95; 50-ft. magazine $3.50; 8mm double 25-ft. $1.65—processing included. Stock up! Fotoshop. Room 506. 18 East 42nd Street. New York City.

WANT To Be In The Movies? 3c stamp brings details on movie acting guide. Write Players. 5343 Sunset. Hollywood. Calif.

BRAND new 16mm sound projectors $129.50. Send 10c for photographic catalog. Sterling's. 679 Northampton. Easton. Penn.

FREE movie list. Superior Film Service. Box 713. Troy. N. Y.

"LADY Eve" Glamour. Select Movies. Projectors. Screens. Free Catalog. Home Pix. 1674 Broadway. New York 19.

LEARN movie projection, management. Free Catalog. Theatre School. Elmira. N. Y.

SAVE 50% on Movies. Free Circulars. Sample Film. Fromaders. Davenport 5. Iowa.

HOLLYWOOD Newsletter. Home movie bargains. studio information. dime. Bailey Films. Box 2528. Hollywood 28. Calif.

WE Buy. Sell. Rent. Exchange Home Movies. Details for dime. Midland. Box 429. Oak Park 3. Ill.

BARGAINS in good used 16mm. sound films. Complete one reel subjects often available at $2.95. List for stamp. Blackhawk Films. Davenport. Iowa.

BUILD your own 8 mm sound projector. Send $1.00 for plans. source of supply for parts and 8 mm sound fiilms. Standard Sales. Box 7525. North Kansas City. Mo.

8 MM CINEX Projectors. economically priced. Becco. Box 675. Charleston. S. C.

ART model films 16mm rentals exclusively. adults list. Enclose stamp. Revere Films. Box 1051. Detroit 31. Mich.

FREE Movie Catalog; sample films 10c. Goodwill Company. Jackson. Tennessee.

52 MUSIC, MUSICAL INSTRUMENTS

JIMMIE Rodgers. Ernest Tubb. Other records bought. sold. Evans. 2215½ 7th. Lubbock. Texas.

SWISS Musical Units $3.00. Music Boxes. 131 West 42nd. New York 18.

PHONOGRAPH Records Cheap. Catalogue. Paramount. BS-313 East Market. Wilkes-Barre. Penna.

PLAY Most Popular Piano! Send 20c for home study folder and novel breaks for hit-tunes. Christensen Studio F. P. O. Box 185. Wheaton. Ill.

53 SONG WRITERS

SONGWRITERS: Send Poems for Free Examination and Outstanding offer. United Music. 116. Salem. Indiana.

POEMS Wanted to be set to music. Free examination. Send poems. McNeil. Master of Music. 510-PS. S. Alexandria. Los Angeles. California.

SONGWRITERS. Songs Published Monthly. Advance Royalty. Send your songs or poems today for our exciting offer. Hollywood Tunesmiths. Dept. 10F-C. 1537 N. Vine. Hollywood 28. Calif.

POEMS Wanted For Musical Setting. Send poem for free examination. Five Star Music Masters. 646 Beacon Bldg., Boston.

AMATEUR Songwriters . . . M.C.C.A. is for You. Music Composers Club of America was organized to help amateur songwriters win the recognition they deserve. (Lyric or Melody). send 3c in stamps for handling. 6758 Hollywood Blvd., Hollywood 28. Calif.

SENSATIONAL Composing offer. Terry. 709½ PS North Broadway. Oklahoma City 2.

SONGWRITERS—Send your best poem for immediate consideration and Free Rhyming Dictionary. Richard Brothers (Music Composers). 46 Woods Building. Chicago.

POEMS Set to Music—Splendid Offer. Rush Poems. Radio Composers. WPSM. Clinton. N. C.

FREE examination. Send poems. Broadway Song Service. Room 1208-PS5. 1650 Broadway. New York City.

YOUR poems set to music. recorded by professional artists. Send poems or write. Free booklet. attractive offer. Song Service. 331-J West 46th. New York.

54 RADIOS, SUPPLIES & EQUIPMENT

MAKE Simple. Tubeless. Batteryless. Distance-Getting Crystal Radios. Crystal and illustrated instructions 25c postpaid. Allen. 427-S. Clinton. Mo.

FM on old radios! Free Data! Topical Emprise. 1527 Highland. Box 42 C. Louisville 4. Ky.

FREE Morse Code lesson. Complete course $1.00. Dept. S. Otto Luther. New Preston. Conn.

27 YEARS of experience radio repairing. Simplified system. No calculations. No formulas. Total price $2.00 postpaid or C.O.D. Money back guarantee. Ross Radio. 14615 Grandriver. Detroit 27. Michigan.

FIX any radio. Amazing new instrument locates radio troubles double quick. Simple instructions show you how. Thousands now in use. Free—Write today for 28-page illustrated technical manual. "The Inside Story". Feiler Engineering Co., Dept. 5PS9. 945 George Street. Chicago. Ill.

SAVE money. Guaranteed tubes 34c ea. 25 Popular types. Many other bargains in radio & television sets. parts. amplifiers. record-changers. Write today for Free Bulletin. Radionic Equip't Co., Dept. (1505). 170 Nassau St., N. Y. 7. N. Y.

BUILD your own radio test equipment. Free catalogue. Bradshaw Instruments. 34-42 Flatbush Avenue. Brooklyn 17. N. Y.

"INSTRUMENTS". Professional Type Electronic Volt Ohmmeters—Signal Generators—Tube Testers—etc., for Fraction of usual cost. Save money. Instruments Development Co., 605 Memorial Dr., S.E., Atlanta. Georgia.

PORTABLE Phonograph Kit $11.95 Complete. 2 Watt Output. 110 V.A.C. Simple Instructions. Satisfaction Guaranteed. $5.00 Deposit. Balance C.O.D. Salco. 297 Broadway. Dept. S. Brooklyn 11. New York.

GUARANTEED Repair! Almost any radio: $3.75! Ship to W2PJV. Owego. N. Y.

TELEVISION. radio. tubes. parts. Send for free bargain list. Hallmark. 594 Communipaw. Jersey City. New Jersey.

HEARING Aids. Used. Reconditioned. Make wonderful miniature radio equipment. $20.00 complete with cords. earphone. Shelby Instrument. 321 W. 7th. Long Beach. Calif.

56 BUSINESS OPPORTUNITIES

$25 WEEKLY working two hours daily. No canvassing. No Manufacturing. Lycke. Box 2471. Cleveland 12. Ohio.

137 PLANS to make money local. mail order. Particulars free. Elite Co., 220-A Grand St., N. Y.

GOOD Paying Business Silvering mirrors. plating autoparts. reflectors. bicycles. bathroom fixtures. etc., by late methods. No tanks or shop required. outfit furnished. Free Booklet. Gunmetal Co., Ave. E. Decatur. Illinois.

OPERATE profitable mail order business. Write Walter Service. 4159-B East 112th. Cleveland 5. Ohio.

A FACTORY in your home garage! Mfg. and sales rights. mechanics' waterless hand cleaner. $500-$800 monthly. No special equipment necessary. Formula free. Western Aircraft Mfg., Dept. G. Los Angeles 6. Calif.

PLASTIC Tablecloth Covers. Curtains. Drapes. Baby Pants. Bowl Cover and other Plastic Articles selling like wildfire! Make big money now! Free Details. Write L & M Co., Dept. 59-N. 510 St. Charles. St. Louis. Missouri.

MAKE $5.000 or more a year in advertising. Be your own boss. No experience necessary. Learn how. Write N.A. Advertising. La Grange 6. Indiana.

ENVELOPES addressed accurately. reasonably. Fast Service. We have capable addressers in your city. Glenway System. 5713-Z Euclid. Cleveland 3. Ohio.

START Mailorder Bookshop—Everything furnished. 25c brings booklet. samples. exciting ideas. General Publications. Ossining 1. New York.

TRAVEL Anywhere: Anytime. Earn $85.00 week up. No experience necessary. Literature free. Travel. LaGrange 2. Ind.

MAKE money addressing envelopes. Our instructions reveal how. Glen Glenway. 5713 Euclid. Cleveland 3. Ohio.

MAKE Money spare or full time. casting Metal Toys and Novelties. Latest scale model Autos. Original Ashtrays. Savings Banks. Water Pistols. etc. Enormous wholesale and chain store demand keeps manufacturers busy. No experience or special place necessary. Write for details and illustrations of patterns needed. Metal Cast Products Co., Dept. E. 1696 Boston Road. New York City 60. N. Y.

VENDING machines earn big money! An investment as low as $10.50 will start you in this fascinating. profitable business that can lead you to the road of success and independence. Routes can be established and operated in either full or spare time with no experience needed. Write for full details and our Free catalog illustrating our nut. candy. gum and stamp vendors; also pin ball machines. music boxes. etc. Write immediately to Parkway Machine Corporation. Dept. 9. 623 W. North Avenue. Baltimore 17. Maryland.

POPCORN Machines. Potato Chip outfits. Long Eakins Co., 4963 Hi St., Springfield. Ohio.

I MAKE big money in the mail-order business. You can do the same at home with copyrighted system. Write me. I'll tell you how. F. Little. RD # 1. Glenshaw. Pa.

RECAST old batteries into new. Latest achievements. Battery Laboratories. Minneapolis.

Copyrighted material

POPULAR SCIENCE OPPORTUNITIES

OPERATE your own Photographic Business. Sales terrific! Cameras, projectors, enlargers, darkroom equipment, accessories, etc. Free details. Peace Products Co., Dept. 501, 152 West 42nd St., New York City.

PERFUME—Make it yourself. Learn how Free. Profitable sparetime—Home Business. Men and Women write "International", 6347 Parnell-PS-5, Chicago 21, Illinois.

CASH For your idea. 280 manufacturers need inventions, patented or unpatented. List free. Invention Bureau, 208-S Clinton, Oak Park, Illinois.

EXTRA Easy Money. Servicing. Repairing Radiators. Home Study. Radiatorman, Box 45, Hayward, Wis.

OWN Mirror Shop. Resilver Mirrors. Glass Sign Making. Electroplating. Supply Prices. John Sprinkle, V90, Marion, Ind.

COLORGLAZED Concrete Pottery made without molds. Patented method. Cemetery products, novelties, tiles. Basement leak-sealing. Money-making projects. Booklet, details free. Men only. National Potteries, Grand Rapids, Minnesota.

"SPECIALTY Manufacturing". Big money business. Start on small capital with dependable formulas. Send for Free interesting booklet. Howard Robinson, Ph. G., 1300-B South Ohio Street, Sedalia, Mo.

BIG money. Spare or full time in your home. No Selling! Spray New Miracle Finishes, Plush and Suede, on signs, radios, automobiles, figurines, lamps, toys, etc. Our business is booming—new easy Flok-Kraft methods—material costs few pennies. You get dollars. Free samples, complete powerful money making plan free. Write now! Coast, 1515B W. Manchester, Los Angeles 44.

FOR an extremely profitable lifetime business, operate a Collection Agency—Credit Bureau. Easily learned. Free folder. Cole & Associates, Syracuse 2, N. Y.

LIQUID Marble—Colorful, glossy! Molded, Brushed, sprayed! Cast Novelties, Statuary, Colored Tiles, Flexible Molds, Composition Floors. Particulars Free. Marbelizing Service, Edwardsville, Ill.

GET into the paint business! Sell full line top quality guaranteed paints to homes, offices, factories, institutions. Build growing business with products in constant demand; 1949 will be biggest paint year in history. No investment; work full or part time; commissions advanced; chance to become trade salesman or own your own paint store later. Write today! Standard Industrial Products, Inc., Dept. PS-5, Evansville 4, Indiana.

WEAVING moth-holes, burns, tears in wearing apparel From your own home or store. Method copyrighted. Work done by hand. $120. Amber Weaving Service, 611 Main Street, Buffalo 3, New York.

FREE samples and instructions to Manufacturers and Hobbyists. Glasy-Cast, the Cold-Set Liquid Plastic. Pours like syrup. Hardens like glass. Make novelties, toys, jewelry, Machinery parts, etc., the quick and easy way. Special introductory offer 2¼ lb. can $2.95. Elasto-Mold: Flexible production molds made in 20 minutes. Also quality rubber latex. Wholesale Prices. Plastic Service, 294 Washington St., Dept. PS5, Boston 8, Mass.

FREE Course casting novelties. Finest latex for molds. Dry sample sent. Major Chemical Co., 164 Portland St., Cambridge 39, Mass.

HIGH Profits! Small Investment! Fast Selling! Bottle and sell new Rug and Upholstery Cleaner under your name. Send for details at once. Hanso Products, 621 E. 21st St., Erie, Pennsylvania.

METALLIZE Baby Shoes. Repair Dolls. Make Rubber Stamps. Silver Mirrors. Make Plastic Novelties. Catalogue of "30 Ideas" Free! Universal, Box 1076-B, Peoria, Ill.

TRADE and Class Magazines. Keep posted. Latest single copies. Over 1000 covering every trade, business and interest. Price list Free. Commercial Engraving Publishing Co., 34S North Ritter, Indianapolis 19, Indiana.

MAIL Order Offers Increases Income. Independence. Unlimited Possibilities; free literature. Manhattan House, 126 Lexington, New York 16.

LEARN Piano Tuning, repairing at home. Tremendous field! Piano parts, tools furnished. Established 1935. Empire School of Piano Tuning, Dept. 12-A, 1753 S.W. 23rd Terrace, Miami 33, Florida.

QUICK Fortunes Made from This Fabulous New Oil Boom Colorado—Wyoming. Big New Field Just Brought in. $140 buys 40 acre lease if rightly placed could make you independently rich for life—$5,000—$10,000—$20,000 up. I'll look after your interests. Your last big opportunity. Dyer-PS, 1835 Champa, Denver, Colorado.

HALF Million articles Wholesale. Directory 25c. Krueger, 3418 Wolcott, Chicago 13.

PLANNING a small mail order business? Booklet shows How. 36 pages full of opportunities. Copy only 10c. Special. Clarence Woodfall, Publ., Route 3, Charleston, Illinois.

EXCEPTIONAL Money Making Opportunity for live-wire Distributor. Dealer's county franchise now available for fast selling, low-priced fire extinguisher and alarm. Made of glass, modern as tomorrow. Tremendous market. Big profit. Write for full information. Autofyrstop Co., Dept. C-5, 2035 Washington Ave., Philadelphia 46, Pennsylvania.

"ELECTROPLATING Know-How"—get the professional know-how of modern electroplating, fascinating money making field, simply and quickly! Write for free illustrated booklet. Joseph B. Kushner, Electroplating Engineer, Stroudsburg 5, Pa.

ELECTROPLATE on non-metallics. Instructions $1.00. Four ampere plater $19.95. Eight ampere $29.95. 30 ampere $85.00. Kissel Electric Products, 431 Sherman, Galion, Ohio.

LIQUID Rubber, make flexible molds. Free Sample. Chaney, 1130 E. 16th St., Jacksonville 6, Fla.

ELECTROPLATING Instructions, and formulas for Brass, Copper, Cadmium, Chromium, Nickel, Gold and Silver plating. All for 25c. S. Hyde, Box 2099—Station V, Los Angeles 3, California.

BABY Shoe Metallizers! Problems? Want to Expand? Consult Nationally Recognized Authority for Assistance. I'll help you! Modest fees. Write for Free data and rate schedule. Joseph B. Kushner, Electroplating Consultant, Stroudsburg 5, Pa.

QUICK Money! "Repairing Car Batteries." At home! Easy too! Batteryman, Grand Junction 1, Colorado.

PLASTERCRAFT Course and illustrated catalog of complete supplies free on request. Jayhawk, Blue Rapids, Kansas.

YOU can make a $3200.00 investment pay for itself in less than a year. A small, complete, Dry Cleaning Business affords good income and independence. Triplex Industries, 3601 South Racine Avenue, Chicago, Illinois.

SALESMEN—Dealers—Distributors: Every office buys new device. Quick Demonstration conveniences. Sells $24.50. You profit $12.55. Exclusive territories. Geo. Wentz, San Marcos 5, Texas.

WHERE To Buy 800,000 Articles Wholesale! Details free. Schibani, Box 1576, Birmingham 1, Ala.

BE a showcard writer. Learn at home in three weeks. Uncrowded. Big money field. Make sales very first week. Write R. J. Meisner, 1539 Wisconsin Ave., Dept. 17, Flint 6, Michigan.

100 BUSINESS Ideas—10,000 Formulas. Mail Order-Home-Farm-Workshop. Particulars Free. Flasco Sales, 2505PK 150 Street, Flushing, New York.

BRONZING baby shoes is big business—Start your own business for $4.95 includes materials and instructions—no equipment required—free particulars. Metalsealed, Box 2095, Wichita, Kans.

NATURAL molding latex. Extra thick. Free Sample. W. Wooley, 115-B Donald, Peoria, Illinois.

OPERATE Profitable Home Mail Order Business. Free Particulars. Write Burnell Service, 710-A Thomas Road, Lynchburg, Virginia.

MANUFACTURERS! Looking for a Hot item? Make the new Frozen Perfume. Easy, Profitable. Write Immediately. Pincus, 1902 E. 18th St., Brooklyn, New York.

BRONZED baby shoes mountings. Metals. Plastics. Onyx—bronzing supplies—wholesale—Box 2095, Wichita, Kansas.

BUY nationally advertised merchandise for others; radios, appliances, etc. Make commission each purchase. $5,000 year possible. Easy, fascinating new business. Free information. Cox, Saugus 9, Massachusetts.

FREE Folio. 500 Money Making Deals. Business plans. Success schemes—Formulas and Mfg. trade secrets. Mail order tips—Exposes—Ideas. Wholesale supply sources. Formico Prod., Box 572, Dayton, Ohio.

FREE Book "372 Unusual Worldwide Business Adventures"! Australia, Africa, South America, New Zealand! $800 month reported (exceptional). Work delightful enterprises home. Prepare for surprise! Publishers-C2, Carlsbad, Calif.

REAL money making opportunity making Interlocking Concrete building blocks. Rex Products Co., Dept. 21, Piqua, Ohio.

BABY Shoe Mounts-Lamps. Carter Picture Lamps, 608 S. 83 Place, Birmingham, Ala.

FREE booklet — "$4,000 Annually". Homegrown orchids, herbs, roses, coffee. Enterprises-P, Toronto 12, Canada.

OPPORTUNITIES unlimited. Outstanding mail from dealers everywhere. Name listed 25c. Sibley, Mendon, Mass.

TEN Mail Magazines 50c. William Stivers, 40 Salem, Medford 55, Mass.

EASY dollars by mail. How? Revealing booklet free. Howard House, Melrose 901, Massachusetts.

MAIL business magazine. Sample Free. Lincoln, Box 449, Irwin, Pennsylvania.

MAILORDER advertising, written to order. Big, positive results! Guaranteed! Finkle Associates, 257-P South Spring, Los Angeles 12.

RAISE Giant Chinchilla rabbits. Tremendous profits from gorgeous fur, delicious meat. Ideal business. Chinchilla Rabbitry, Box 142, Fairmont 20, West Virginia.

BALL Pen Ink. Ten to twenty year personal supply, instructions and exclusive distributor offer. $1.00 postpaid. Pen cartridges refillable many times. Millions discarded monthly. Consumer needs this new. Ink costs 5 to 10c year. Treanor, 1113 Walnut, San Gabriel, Calif.

SAWDUST. Turn it into cash. Six methods. Instructions 25c. Charles, 12-FB, Norwood, Ohio.

"HOW to Build Your Own Mail Order Business." Book for Beginners. 25c. Satisfaction Guaranteed. Gold Seal Mail Order Service, 509-A So. Harris St., South Bend 19, Indiana.

BABY Shoe Mountings;—Book Ends, Ash Trays, Frames, Etc. St. Albans Plating & Casting, Dept. 8, 135-17 135th Avenue, So. Ozone Park 20, New York.

SELL Jewelry By Mail—everything furnished ready to go. Orders filled—Small Capital. Tremendous possibilities! Jomay, Box 1224-B, Toledo 3, Ohio.

BIG Time Profits. Handling popular, fast-selling books by mail. Everything furnished. Unusual possibilities—small capital—no experience. Write: National Distributors, Box 88-B, Dorchester, Mass.

EARN Money At Home! Make, Sell, delicious Candies. Full, Spare time. Get professional instructions. Easy—pleasant. Write: Etterman, 1991-B, Lake, Muskegon, Michigan.

MAKE Big Money In Home Mail Business! Few dollars starts you—interesting, profitable! Write: Smith, Box 2592-B, Hines, Illinois.

FIGURINES. Gift ornaments. Unpainted, many to choose from. Start a profitable business—Hobby. Free catalog and information. Suiter Art Industries, 314 Westport, Kansas City, Mo.

WOULD you pay 3%—first $350 make? Color-illustrated book "505 Odd, Successful Enterprises" free! Work home. Expect something odd! Pacific, Oceanside, Calif.

HOUSE Paint—Wholesale $2.70 gallon. Agents wanted. Free advertising offer. Certified Products, 812F, 38th, Louisville, Ky.

Copyrighted material

POPULAR SCIENCE OPPORTUNITIES

90c PROFIT Every dollar sale. Siegel. Box 183. New York 2.

HOW and where to obtain Capital? Free details. Star Service. Wapakoneta. Ohio.

$46 FROM Square Foot Plywood; Jigsaw necessary. Write; Woodart. Bridgewater. Massachusetts.

MAILING postcards selling repeat merchandise is profitable. Everything supplied. Details free. Gordon Publishers. Box 23. Pawtucket. R. I.

METALLIZE Baby Shoes. Excellent profits. New system assures success. Free details. Treasures Forever. 89-B Henry Ave.. Lynn. Mass.

LOCKSMITHING & Keymaking—Learn at home. Excellent full or part time earning opportunities. Professional outfit includes supplies. tools. key making machine —everything needed to start your own business. Get practical training from Master Locksmiths on house locks. auto locks. padlocks. Booklet of Information Free. Write today. United Supply & Service. Dept. PS-2. 3327 Madison Street. Chicago. Illinois.

YOUR own profitable business. New sample press. puts permanent hard plastic covering on drivers licenses. credit cards. photos. etc. Small investment. Write Studebaker Machine Company. 1233 S. 9th Avenue. Maywood. Illinois.

BRONZED Baby shoe mountings and supplies. All metal bronze bookends. picture frames. ashtrays. etc. Onyx ashtrays. desk sets. plaques. Hardening solution. 30-amp plating rectifiers with powerstat control. $85.00. Geared motors for agitation $20.00. Lead lined tanks. Write for list. Hollywood Bronz Supply. Dept. S. 1770 N. Vermont. Hollywood 27. Calif.

EARN $50.00 or more weekly operating a route of nut and gum vendors. slot machines. stamp vendors. etc. in your spare time. No experience necessary. Details free. Danco Coin Machine Co.. Dept. PS 1304 E. Baltimore St.. Baltimore 31. Md.

MAKE money making new greaseless doughnuts at home on electric machine. Wholesale to grocers. drug stores. cafes. hamburger shops. Send for free recipes and plans. Ray Do-Nut Company. 3605 South 15 Ave.. Minneapolis 7. Minnesota.

57 MONEY MAKING OPPORTUNITIES

DETECTIVES Earn Big Money. Experience unnecessary. Particulars free. Wagoner. P-125. West 86th. N. Y.. N. Y.

NO selling. operate coin machines. amazing profits. details Free. Parkway Corporation. Dept. 18. 623 W. North Avenue. Baltimore 17. Maryland.

PROFIT with Larson Leathercraft. Belts. purses. 100 other ideas. Largest supply in U. S. Catalog 10c. Larson. Dept. C. 826 S. Tripp. Chicago 24.

NOW available! 1949 Edition of Official Concessionaire's Guidebook. Jam-packed with money-making ideas. games. formulas. equipment for concessions. roadside stands. carnivals. medicine business. etc. Buyers Guide. Send $1.00 today for copy. Concessionaire's Guidebook. Box 133A. Sta. B.. Toledo 6. Ohio.

"THIS Is It!"—Learn Sewmachine Repairing. plus profitable installing our motor kits. etc. Write—Taylor Service Co.. Hamilton 2D. Ohio.

LEARN professional candy making. easy method. free details. Philip Pate. Kissimmee 2. Fla.

$50—$100 WEEKLY. Own Business. Details $1.00. Elro. Bergenfield. New Jersey.

URANIUM Mining makes money. Latest facts in The Mining Record. Free sample copy. 1829 Champa. Denver. Colo.

"EVERYBODY Likes Candy." Learn to make in a professional manner. (Our 39th year.) Ragsdale Candies. D10. East Orange. N. J.

MAKE $100 per week or more in a full or spare time baby shoe metalizing business of your own. Write now for free literature on this easy to learn highly profitable business. Joseph B. Kushner. Metal Finishing Engineer. Stroudsburg 5. Penna.

500 MONEY Making Tips. Ideas. Formulas. Schemes. Plans. Folio Free. Formico Crafts. Box 572. Dayton. Ohio.

EARN Money Evenings. copying and duplicating comic cartoons for advertisers. Adservice. Argyle (2). Wisconsin.

15 MINUTES Masters Advertising and Sign Lettering; Complete System; Sign Painter's Secrets; Cartooning Book; All three $1; Free Circular. Abenterprizes. Box 875-S. Peoria. Illinois.

25 MONEY-Making tips 10c. Splendid possibilities. Sunrae. Ogema 7. Wisconsin.

"EARNING Money at Home"—valuable booklet contains hundreds of ideas and tips for profitable home-employment. Price $1.00. V M Publishing. 834 N. Wells Street. Chicago 10. Illinois.

EXPORT from home. Large Profits. Simplified 20 lesson course plus 150 names foreign customers. Free details. Mehlman Export. 263 East 91st. Brooklyn 12. N. Y.

FABULOUS money! Grow dwarf trees indoors. free of cost. Oriental Secret. Instructions $5.00. American. 385 Latijera Station. Los Angeles 43. Calif.

SELL By Mail: Latest Magazines. etc.. Containing Valuable information 25c. Sibley. Mendon. Mass.

WANTED Home workers: Men-Women; Easy; Children can help. Send 25c deposit (Credited) For details and gift. Bishop Novelties. Box 877-S. Milwaukee 1. Wisc.

UNPAINTED Figurines. Beautiful Models. Finest quality. smooth. hard plaster. Reasonable prices. Illustrated list free. Oman. 642 Broadway. St. Paul 1. Minn.

"MAIL Order Digest Magazine". Contains interesting profitable information! Sample 25c. Bosserman. 4047E2 Westway. Toledo 12. Ohio.

WOULD You pay 3% —first $350 made? Color-illustrated book "505 Odd. Successful Enterprises" free. Expect something odd! Pacific. Oceanside. Calif.

HELICOPTER. 14" Rotors. Rubber Motor. $3.00 Dozen. $1.00 Two Samples. Heliotoy. Rt. 8. Dallas 11.

77 PROVEN Moneymaking Plans. 128 page book. Send only $1.00 for your copy. Palmer Publications. 4219 Southwest Marigold. Portland 19. Oregon.

SHELLCRAFT! Make beautiful sea shell jewelry. Income or Hobby. Pace's. Box 279SP. Brandenton. Florida.

58 FORMULAS, PLANS, ETC.

FORMULAS—All kinds. Latest products. Literature free. Kemico. Park Ridge 15. Illinois.

10.000 FORMULAS and Trade Secrets. Free Literature. Stillmans. 555 Kingston Ave.. Brooklyn 3. N. Y.

MAKE "Shupol". Shines all shoes. Formula $1.00. B. Reynolds. 72 Forest Drive. East Northport. New York.

LABORATORY tested formulas. Lists free. Pont. Box 635-PS. Terre Haute. Ind.

59 PLASTICS

NEW Liquid plastic. Clear. colors. Cast without heat. Embed flowers. insects. coins. Saw. drill. carve. Complete kit only $3.95 postpaid. or send 25c for exciting new home project manual showing how to get started. Castolite. Dept. E-401. Box 391. Woodstock. Ill.

LUCITE Plexiglas. Any size sheets masked. Square foot cost 1/16" 96c; 1/8" $1.25; 5/16" $1.52; 1/4" $1.80; up to 1 1/2" available. Colors add 10%. Include 10% postage. Almac Plastics. 230 Fifth Avenue. New York 1. N. Y.

PLASTIC. Sheets. Rods. Tubes. etc. Free List. Plastic Supply Co., 2901 N. Grand Blvd.. St. Louis 7. Mo.

PLEXIGLAS—12" x 12" Masked Sheets. 1/16"—$1.00. 1/8"—$1.25. 3/16"—$1.55. 1/4"—$1.85. Include 10% postage. Dyes. Rods. Tubes. Luminous Powders. Carving blanks. Drills. jewelry findings. Free Catalogue. Craft Plastics. Somerville 2. N. J.

PLASTICS—Supplies. findings. shells. Illustrated fabricating manual. bargain catalog. 10c. Gem-O'-Lite. Box 5350 Riveton Ave.. North Hollywood. Calif.

"CHEMIGLAS"—water-clear. rapid casting resin. Technical Pamphlet. 25c. Technicraft. 1156 Commonwealth. Boston 34. Mass.

RADIO tubes. Kits. Free lists. Potter. 1314 McGee. Kansas City 6. Missouri.

PLEXIGLAS—Write for Free Price List. The Unique Glass Shop. 309 Cowardin Ave.. Richmond. Virginia.

INTERNAL carved roses. orchids. swans. goldfish. butterflies. etc. Jewelry and gifts. Crystal Floral Novelty Co.. Bound Brook. New Jersey.

60 CHEMICALS AND APPARATUS

HANDBOOK for Chemical Experimenters. Hundreds of Experiments; Illustrated. 50c. Experiment Booklet. 15c. Supply Catalog. 5c. Reading Scientific Co.. Reading. Penna.

NEW Laboratory supply catalog of Chemicals and Apparatus. Contains many thousands of items with illustrations. Send 25c. Standard Science Supply Company. 1232 N. Paulina St.. Chicago 22.

NEW Idea Chemical and Apparatus Outfits for Home Experimenting. Photo-Scales. Microscopes. Chemicals. Biological and Laboratory Supplies in Small Quantities. Catalog 15c. Established 1931. John H. Winn. 124-B West 23rd Street. New York. N. Y.

CHEMICALS and apparatus for industrial. analytical. and private laboratories. Catalog 15c. Dept. M-26. Biological Supply Co.. 1176 Mt. Hope Ave.. Rochester 7. N. Y.

CATALOG Free: Everything for the home lab. Medal Laboratories. 1521 121st Street. Whiting. Indiana.

COMPLETE supply catalog. 10c. Pilgrim Chemical. 348-UU Edith. Salt Lake City 4. Utah.

SUPPLIES. New used. Catalog 10c. refunded first order. Atlantic Laboratory Supply. 21 Wenham. Boston JP. Mass.

61 HELP WANTED

ALASKA. The Last Frontier offers unlimited opportunities. $1 brings government map and Directory listing firms in Fishing. Construction. Mining. Aviation. Fish & Game rules. Homestead data. Alaska Opportunist. Box 883-S. Hollywood 28. Calif.

CONSTRUCTION Report — Send $1.00 for World Wide Job Project Listings. Up-To-Minute Facts for Construction Men. Global Reports. P. O. Box 883-PX. Hollywood 28. Calif.

BOYS Wanted. Over $2.00 hour! Sell name plates for front doors. Free Sample. Write Dept. 66. National Engravers. 214 Summer. Boston. Mass.

INTERESTED In Latin American & Foreign Employment??? $1.00 brings Foreign Service Directory listing Oil. Construction. Mining. Aviation companies. Exporters and Importers. Hot tips for applications. Global Reports. Box 883. Hollywood 28. Calif.

HELP Wanted! Reliable person to mail letters in spare time. Big money. Details for stamped envelope. Martin's Service. Box 295A. Bassett. Va.

FOREIGN Employment?? List of Overseas projects with application form. $1.00 Cash (C.O.D. $1.32). Foreign Service Institute. Box 3980. Miami 24-A. Florida.

SCHOOLBOYS. sell our "Secret Envelopes." Sample free! Stampico. Detroit 4. Michigan.

62 AGENTS WANTED

GOOD Paying Business Silvering mirrors. plating autoparts. reflectors. bicycles. bathroom fixtures. etc.. by late method. No tanks or shop required. outfit furnished. Free Booklet. Gunmetal Co.. Ave. G. Decatur. Illinois.

EXCELLENT Sideline for printing and advertising salesmen. Decalcomania name plates in small quantities. Great demand. Also. make money with our line of Automobile Initials and Sign Letters. Free Samples. "Ralco". XL-Roxbury. Boston 19. Mass.

AGENTS—300% profit selling genuine gold window letters; stores and offices. Free samples. Metallic Letter Co.. 437 N. Clark. Chicago.

FREE water and our concentrates make flavors. lotions. shampoos. 125 products. Labels. bottles supplied. Qualco. F-20030 Russell. Detroit.

GOLD lacquered Window Sign Letters. Large Sizes Penny Each. New Foils. Absolutely Beautiful. Free Samples. Atlas. 544 W. 79th. Chicago 20.

Copyrighted material

POPULAR SCIENCE OPPORTUNITIES

A DRESS for You with every 3 you order for yourself and family. Amazing new plan. Everything Free. Harford Frocks. Dept. D-9129. Cincinnati. Ohio.

SELL By Mail Books. Novelties. Bargains! Ready Made Circular Service! Large Profits! Catalog Free! Elfco. 432 North Wells. Chicago 10.

FREE Samples. Big profits showing amazing Glow-In-The-Dark specialties. House numbers. pictures. plastic novelties. religious and nursery objects. etc. Large manufacturer. Madison Mills. 303 Fourth Ave.. New York. N. Y.

STOP! Want To Make Money All Year Round Selling a complete line. Wool Uniforms. Shirts. Caps. Ties. Badges. 2000 Emblems. Personal Initialed Buckles. Belts. and hundreds of other easy-to-sell items. Sales Kit furnished. Please write today. Hook-Fast Company. Box 480-PS. Roanoke. Va.

450 NEW Jobs open every month in selling! No experience required. Beginners make $100 to $200 a week. Bill Michaels makes $18.000 a year. Thousands doing equally well. You too can have full security. Mail only $1.00 today for 12 months of Opportunity. the magazine that offers the cream of the best selling jobs breaking each month. If not satisfied—money refunded. Opportunity Magazine. Dept. 22. 28 E. Jackson. Chicago 4. Ill.

POCKET Pal: Replaces Pocket Knives. New. safe. beautiful. Always razor sharp. 50c seller. 321% profit. $15.00 up daily. Agents. Salesmen. Distributors. Sample. elaborate sales kit 25c. Nelson Company. Moore Bldg.. St. Paul 2. Minn.

ADVERTISING book matches—Cash in on big demand—sell Union Label matches. Cuts for all businesses and political parties—Free powerhouse selling kit—low prices—protection guaranteed on repeat orders—Cash commissions. Superior Match Co.. Dept. P-49. 7530 Greenwood. Chicago.

SEWING Machine electrification kit. Nationally advertised. Has Good Housekeeping Guaranty Seal. Can be demonstrated and sold in 5 minutes. Make at least $5 per sale. For complete details write today to Brownell Distributors. Inc.. Dept. PS. 308 Canal St.. New York 13. N. Y.

I'LL Put A "Shoe Store Business" In Your Pocket! Nation's Leader trains you to make Big Money! Fit men. women. Free Sample Outfit—Write Today! Victor Thomas Shoe Company. Dept. V-302. Chippewa Falls. Wisconsin.

FREE Samples. Big profits showing amazing Glow-In-The-Dark specialties. House numbers. pictures. plastic novelties. religious and nursery objects. etc. Large manufacturer. Madison Mills. 303 Fourth Avenue. New York 10. N. Y.

TOP Profits. Useful specialties that satisfy. Sell on sight. Our 36th Year. Ufert. 16 East 17th St.. New York 3.

START Your Own Business On Credit. Always your own boss. 1554 Dealers. sold $5.000 to $26.500 in 1948; their average $6.742. We supply stocks. equipment on credit. 200 home necessities. Sales experience not needed to start. Wonderful opportunity to own pleasant. profitable business backed by world-wide industry. Write Rawleigh Co.. Dept. E-U-PSC. Freeport. Ill.

LOOK! Make money all year round selling personal initialed individualized belts. buckles. cap badges. western buckles. tie holders. name plates. 2000 emblems to choose. Big profits. whole or part time. Please write today special outfit offer. Hook-Fast Specialties. Box 1425. Dept. 7. Providence. R. I. Established 1926.

NEW "Sponge" Dish Cloth. Replaces messy dishrags. Banishes dishwashing drudgery. Lightning seller. Samples sent on trial. Kristee 119. Akron. Ohio.

PINKING Shears Bring Big Profits! Full or part time dealers. canvassers. brush salespeople. etc. wanted. Jarlan Company. 5-J Beekman St.. New York 7.

NEWEST money making sensation. Sell hand painted ties with personal initial. 100% profit. Experience unnecessary. Special offers. Write for free 20 page catalog complete line ties. mufflers. Philip's Neckwear. 20 West 22nd St.. Dept. P-34. New York 10.

FREE Stock Sample. Nameplates for Homes. Desks. etc. Whitney. Oakville. Conn.

BE renewal headquarters for all magazines. Handle everything at home. Big profits. No experience. No capital needed. Free Catalog tells how. Write McGregor Magazine Agency. Dept. 139. Mount Morris. Ill.

BIG Profits. Beautiful stainless steel Flatware. Hand-Mirror-Finish. Sells on sight. Lovely design. Send $1.00 for 5 pieces. Schaaf Brothers. Manufacturers. 76 Vorhees Street. Newark. New Jersey.

WRITE 3 Words—Collect $9.95. Make $9.95 on 10-second demonstrations to merchants. Write on glass with Amazing Magic Crayon and presto—a 5-color Advertising Message takes fire and glows like a brilliant Neon Sign! Three sales a day and $29.85 profit is for "lazy" men. Workers can double or triple that amount. Don't wait. Rush penny postcard for full details. complete Sales Kit—All Free. Maxilume Co.. Dept. LC-95. 125 W. Hubbard St.. Chicago 10. Ill.

AUTO seat covers. Strong fabrics with leatherette trim. Plastic piping. Tailorized to fit any car. Direct from our factory up to 50% saving. Write for free circular. Agents wanted. National Process. Hempstead. Long Island.

BIG money career. Sell guaranteed Nylon uniforms—white. colors. No investment. Highest commissions. Easy. quick sales to waitresses. beauty shops. hotels. nurses. etc. Complete variety fabrics. Exclusive styles. Free Catalog Sales Kit. Upland Uniform. 255 West 28th Street. Dept. H-2. New York.

SELL Slot Machines. Games. Home Bars. Send for wholesale deal. Webb Distributing Co.. 4966 West Chicago Ave.. Chicago 51. Ill.

$6.00 HOURLY showing Firestone Velon handbag—opens into large shopping bag. Fastest seller in America. Women buy several for gifts. Commissions advanced daily. Sample furnished. LeNard. 179-D Washington. Chicago 2.

SELL ultra-blue stock signs to stores. 1000 slogans. comedy. general. religious. "7x11" cost 6c—Sells 35c—Make money. 15 samples Ultra-blue signs "7x11"—$1.00 postpaid. L. Lowy. 8 West Broadway. Dept. 469. New York City 7.

500 MONEY Making Deals. Wholesale supply sources. Formulas. Folio Free. Formoco Co.. Box 572. Dayton. Ohio.

INFORMATION — Wholesale supply sources. Moneymaking plans. Increase your income. Write Reynard Station. Smithfield 3. Ohio.

FREE Nylons given if Kendex hosiery runs or snags! World's only women's hosiery sold with written guarantee amazing everybody. Mere words could not express unbelievable money making opportunity. Fantastic earnings become reality. Armstrong earned $202 in 9 days. Watkins sent 92 orders in one day. Imagine replacing hosiery free regardless of cause—whether use or abuse! Truly sales dynamite for terrific profits. Even if you never sold before. three magic words: "Guaranteed Against Everything" will open doors for you—make women listen and pour money in your pocket. Complete line from sheerest to service (15-20-30-40-60 denier) all lengths 28 to 35 inches—latest colors—seamed full fashioned and seamless. No competition because Kendex guaranteed nylons not sold in stores. Also complete line men's hosiery actually guaranteed for one full year! Nothing like this anywhere. Includes rayon. nylon. lisle. wool. cotton. mixtures. etc. All styles. patterns. colors. prices to please everybody. Thousands shipped daily. 100.000 pairs constantly in stock for fast delivery. Over 30 years in business. You need no money or experience. Nothing to pay now or later. Show free outfits. Write orders. We deliver and collect. Big advance cash plus huge bonus. Earn money spare or full time—exclusively or side line. No restrictions. Become manager—appoint others to sell for you—earn steady income on their sales. Complete money-making outfits including salesbooks in color. samples of hosiery materials. etc. furnished free and prepaid. Simply mail name and address to: Kendex Company. Babylon 54. New York.

BUY thousands of nationally advertised products direct from manufacturers. Write for "Buy Direct and Save". Consumers Assn.. 218-G Investment Bldg.. Pittsburgh 22. Pa.

EXPORT-Import! Represent manufacturers! Conduct two-way profit. barter exchange business without capital. Buy-sell abroad make huge profits. Uncrowded fields. unlimited opportunities. Learn at home in spare time. No previous experience necessary. Send $1 for two 1949 bulletins. supplying hundreds of overseas connections. Money refunded if unsatisfied. International Trade Promotion. 246-S. Fifth Avenue. New York 1.

HOME Agents. Power mower—only $79.50. Terms. Sells on sight. Sales kit—Free. Smith Agency. 451-C. Excelsior Springs. Mo.

$100 WEEKLY—New complete. modern Plastic Line. Tablecloths. etc.—over 25 items. Every home prospect. 100% Profit. Free Samples. Carwell. 330-D So. Wells. Chicago 6.

FANS—Fans—Salesmen making $50.00 to $100.00 per day selling our Electric Fans. Sump Pumps and printed Self Sticking Advertising Tape. Write to Universal Fan Co.. Inc.. Peru. Indiana.

BIG Cash Quick! Best in field! 4 rapid-fire money makers—Modern Wonder Book of Knowledge; only complete War History; new Home Medical Book; Special Illuminated Bible. No personal delivery. Get full facts. Universal House. 1018-I Arch St.. Philadelphia. Pa.

MEN-Women. New Sensational floor mop. So clean to use woman can wash floors in evening gown. No drip or splash. Magic Mop Co.. Dept. 144. Chicago 17. Ill.

SALESMEN—Sideline. Earn $3.000 next 5 months selling calendars. advertising specialties. Buyers everywhere. Big comm. advanced. Samples Free. Continental Calendar. 542-B South Dearborn. Chicago.

AGENTS. Distributors: Huge Profits! Sensational. new "Combination. Shopping Bag-Purse." Lightning-fast seller! Other merchandise; Novelties! Royalty. Box J-748. Passaic. N. J.

BETTER Plastics at Lower Prices! Proven Hits in Tablecloths. Aprons. Garment Bags. Utility Covers. Free Catalogue S95. Acclaim Products. 25 Hillside Avenue. New York 34. N. Y.

BUDGET Books. 25c. Fast Seller. Fine Premium Valuable Mailorder Book Free with 12 Books $1.00. Persil. 436 N. Y. Ave.. Brooklyn 25. N. Y.

RAZOR-Blades-100-For-$1.00 Postpaid. Finest surgical steel durable edge. Send dollar immediately. 5 double wrapped to packet. 20 packets to carton. Wholesale particulars and 5 blades 10c coin or four 3c stamps. none C.O.D. Hardened. tempered. rust resistant. guaranteed unconditionally for any reason money refunded. W. B. McKean Co.. 1407 Nelson Ave.. Bronx 52. New York.

WOULD you pay 3%—first $350 made? Color-illustrated book "505 Odd. Successful Enterprises" free! Work home. Expect something odd! Pacific. Oceanside. Calif.

SELL!! Balloons. Combs. Specialty Merchandise. Carleton House Distributors. Texas City. Texas.

63 HIGHGRADE SALESMEN

LOOK Here! Wanted—Men and women to start in business on credit. Sell some 200 farm-home Products. Thousands our Dealers now make quick sales. big profits. For particulars write Rawleigh's. Dept. E-192-PSC. Freeport. Ill.

SALESMEN—Put yourself in line for big money. real future. Keep stores supplied with 5c-10c to $1 counter goods. Nationally advertised merchandise. Top profits for you. merchants. Liberal deals boost sales. Sideline or full time. World's Products. Dept. 83-S. Spencer. Indiana.

UP to $50.00 in a week and tailored suit for yourself without paying one cent. Write for plan. Progress Tailoring Co.. Dept. S-221. Congress & Throop. Chicago 7. Ill.

67 EDUCATIONAL AND INSTRUCTION

BOOKKEEPERS! Increase your earnings! Operate your own simplified "Dollar-A-Week" Bookkeeping and Tax Service. Full or Spare time. Details Free. No obligation. Ellis. Box 203. Cedar Grove. North Carolina.

Copyrighted material

BE a piano tuner. 13,000 needed in U. S. A. Make $3,000 to $5,000 each year, full or spare time in this intensely interesting and fascinating work. Experience unnecessary. Easy course qualifies you. Knowledge of music helpful, but not necessary. Approved by Veterans Administration. Penny post card brings free details. Free placement service. Harmony School of Piano Tuning, 147-A N. Cameron, Harrisburg, Pa.

EXPORT! Learn at home from established World Trader. Big paying positions. Your own profitable world-wide business by mail order without capital; or travel abroad. Experience unnecessary. Free booklet. Mellinger, 205W Los Angeles 24, California.

NURSES' Training School. Make up to $30-$40 week as a trained practical nurse! Learn quickly at home. Booklet free. Chicago School of Nursing, Dept. M-5, Chicago.

LEARN Piano Tuning at home with sound recordings in thirty days. Electric record player, recordings, tools, and instructions furnished. An uncrowded profession with unlimited income. Write today for detailed information. Capitol City Tuning School, Dept. K, 211 East Michigan, Lansing, Michigan.

GET U.S. Gov't Job! Security. Big starting pay. Prepare at home Now for local exams. Free 40-page book, sample tests. Write: Franklin Institute, Dept. P22, Rochester, N. Y.

WELD cast iron, AC, DC. Free instructions with trial package of Hobart "Nickel-Cast" Electrodes. Send $1.00 for generous sample postpaid. Hobartweld, Box P-596, Troy, Ohio.

BE a Mathematical Wizard. Add Columns Instantly. Free Details. Vanderdrift, 517 Lincoln Place, Orange 1, New Jersey.

PIANO Tuning Pays. Learn this profitable profession at home. Our Tonometer and mechanical aids make learning easy. No knowledge music necessary. Diploma granted. Largest and oldest school—50th year. G. I. Approved. Write for booklet. Niles Bryant School, 77 Bryant Bldg., Washington 16, D. C.

MEDICAL Laboratory Technicians in great demand. We train you in your own home. Catalogue free. Imperial Technical Institute, Box 973-B, Austin, Texas.

NEW! Airplane Design Home Study Course. Airplane Design Corporation, 325 Centre Building, Seattle, Washington.

DENTAL Technician's Practice Kit. Artificial teeth, plastics, etc. Instructions included. Grant Laboratory, R-219 W. 7th, Los Angeles, Calif.

COMMUNICATION and Radio Course: Not a correspondence course, but mailed complete. Written by a former Tech. Rep. with Army Air Forces. Practical, includes necessary theory with physical explanations, absolutely necessary in Radio Repair, Television, and Communications. Not a basic course. $4.00 Postpaid. Mr. Arthur Arruda, 70 Acushnet Avenue, New Bedford, Mass.

DRAFTING salaries are high. Learn now. Monroe Inst., Alton, Illinois.

INDUSTRY needs Chemical Technicians. Learn at home from graduate chemists. Laboratory Included. Write for free details. Institute of Applied Technology, 309 Harvard St., S.E., Minneapolis 14, Minn.

SCIENCE of memory simplified. Free booklet "Memory Development." Memorology Studio, 2016 Sunnyside Ave., Chicago 25, Illinois.

PHOTOGRAPHIC mind! Amaze, earn, learn! Facts, figures, names stick like burrs with Supermemory. Thor Books, S-5, Box 1210, Chicago.

BECOME A Safety Engineer. Job opportunities are present for men trained in safety engineering. Qualify for this attractive profession by studying at home. Write today. Accident Prevention Institute, Box 1796, Dallas, Texas.

NEW Profession—Pedemetry Foot Correction—Learn at home. Write: Department S: American Foot Health Institute, 55 East Washington Street, Chicago 2, Ill.

69 CONTESTS

WIN Big Contest Prizes. Entries written puzzles solved by winners. Reasonable prices. Research, 13 Earl St., Red Bank, N. J.

KONTESTANTS! Let winners write those statements, last lines, sketches—solve those puzzles, quizzes, riddles. Low cost. Kontests, 95 Leighton, Red Bank, N. J.

HITCH Your Wagon to a ConteStar! Send 3c stamp. National Contest Bulletin, Box 2685-C, Miami 31, Fla.

WIN contests: Free information. Contest Advisory Service, 60 E. Scott, Chicago 10, Ill.

70 LANGUAGE OUTFITS

LINGUAPHONE Makes Languages Easy. At home learn to speak Spanish, Portuguese, Italian, French, German, Russian, by quick, easy Linguaphone conversational method. Save time, work, money. Linguaphone Correspondence Courses are available to veterans under G.I. Bill of Rights. Send for free book. State if G.I. Linguaphone Institute, 54 RCA Bldg., New York 20, N. Y.

SPANISH quickly with Speed-O-Way phonograph records. Free Folder. Speed-O-Way 114, Box 2301, Houston 1, Texas.

72 AUTHORS SERVICE

I WANT New Writers to cash hundreds of checks for $1 to $100, offered each month. The easiest way to write for pay. No previous experience necessary. Send for Free details. No obligation. Saunders M. Cummings, 468-15 Independence Bldg., Colorado Springs, Colo.

74 CARTOONING, SIGN PAINTING, DRAWING AIDS

"HOW to make money with simple cartoons". A book everyone who likes to draw should have. It is free; no obligation. Simply address Cartoonists' Exchange, Dept. 195-C, Pleasant Hill, Ohio.

SIGN painting taught at home. Test lesson free. Ben Kerns, Box 812-PS, Greenville, S. C.

EARN Money Evenings, copying and duplicating comic cartoons for advertisers. Adservice, Argyle, (2-B), Wisconsin.

75 CHALK TALK-STUNTS

CHALK Talks, Laugh Producing Program. $1.00. Illustrated Catalog 10c. Cartoonist Balda, Oshkosh, Wisconsin.

76 TYPEWRITERS AND OFFICE MACHINES

AUTOMATIC self-feeding Stencil Duplicators. Post Card Size $13.50. Letter—$45.00. Legal—$51.88. All office machines. Supplies. Typewrite for free literature. Pittsburgh Typewriter Supply, 336-8 Fourth Avenue, Pittsburgh 22, Pa.

RECONDITIONED Typewriters, Printing Devices, Office Appliances, Supplies. Dixiegraph, King, N. C.

77 OFFICE SUPPLIES & EQUIPMENT

HELPFUL Quick-Pic Literature Racks, unrestricted visibility of contents, delightful application, Cards, Folders, Letters, Pamphlets, Tracts, Descriptive Folder, write Edins Service Specialties, 801-09 Pecan St., Abilene, Texas.

STANDARD Typewriters $17.50; Duplicators $12.50; Adders $12.50; Nationwide Service. Typewriters, 118 Spruce, Wichita 7, Kansas.

78 RUBBER STAMPS

RUBBER Stamps all kinds catalogue 10c. Print and Stamp Co., Box 172, Boston 1, Mass.

3 LINES, cushioned, indexed, 55c. Pads 35c. Printright, Wauwatosa, Wis.

QUALITY Stamps! 3 Lines, 50c. 250 Letterheads—Envelopes, $1.98. Catalogue. Johnson Press, Box 6-B, New York City 26.

79 PRINTING OUTFITS, SUPPLIES

PRINT your own cards, stationery, circulars, advertising. Save money. Simple rules. Print for others, nice profit. Raised printing like engraving too. Have home shop. Details free. Kelsey Presses, L-8, Meriden, Conn.

SELL Addressing Machine $24.50. No Plates. No Stencils. Exclusive territory available. Mail Addresser, San Marcos 5, Texas.

HAND Presses, type, cabinets, supplies. Bulletins 3c. Requirements? Box 918, New York 8.

MAKE Your Own Plastic printing cuts. New Plexiplate process. Plexiservice, Argyle 2, Wisconsin.

PRINTING Presses, Type Supplies. Lists 3c. Turnbaugh Service, Loysville, Penna.

SAVE Money on your printing—Write for Free Work Chart for proven techniques for Selling by Mail. Winchester Printing Company, Grand Rapids 2, Michigan.

80 PRINTING, MULTIGRAPHING, ETC.

1000 BUSINESS Cards $2.50 prepaid. Samples free. Reliable Print Shop, 905 East Jefferson, Louisville 6, Ky.

BLACK-On-White photostat prints from drawings, tracings, etc. 25c per copy up to 8½"x11". 50c per copy up to 14"x17", plus postage. United Industries, Box 449, Madison 1, Wisconsin.

500 BUSINESS cards $2.50. 500 8½x11 letterheads $3.50. 500 6¾ envelopes $3.50. Mark's Print Shop, 2024 North 27th Street, Terre Haute, Indiana.

WEDDING Announcements! Lovely! Free Samples. Printshop, 176 Fourth, Leominster, Mass.

400 8½ x 5½ LETTER-heads $1.35. Mango, 555-B South 20th, Newark 3, N. J.

BEAT High Printing Costs. Have it mimeographed. Legible. Attractive. Alvin Thomas, 5210 Woodlawn, Erie, Pa.

PRINTING At Reasonable Prices. Send for Free direct mail layout information. Mail your requirements for Quotations. Winchester Printing Company, Grand Rapids 2, Michigan.

WEDDING Invitations 50 for $5.79. Others priced by paper quality. Photo-Offset, Mimeographing, Printing. Send for Wedding Invitation price sheet. Mimic Reproductions, 383P No. Corona, Valley Stream 5, New York.

82 PATENT ATTORNEYS

INVENTORS. For "Record of Invention" form, contact Carl Miller, Registered Patent Attorney, Woolworth Building, New York.

INVENTORS: Write for free brochure "Evidence of Invention." Labiner, World Building, New York 7.

PATENT practice before U. S. Patent Office. Validity and infringement investigations and opinions. Booklet and form "Evidence of Conception" forwarded upon request. Lancaster, Allwine & Rommel, Registered Patent Attorneys, Suite 413, 815—15th St. N.W., Washington 5, D. C.

INVENTORS: Without obligation, write for information explaining the steps you should take to secure a Patent. John N. Randolph, Registered Patent Attorney, 207 Columbian Bldg., Washington 1, D. C.

INVENTOR'S Guide free on request. Frank Ledermann, Registered Patent Attorney, 154 Nassau St., New York 7.

C. A. Snow & Co.—S-427, Snow Building, Washington 1, D. C. Registered Patent Attorneys. Write for information.

INVENTORS: When you are satisfied that you have invented something of value write me, without obligation, for information as to what steps you should take to secure a Patent. Write Patrick D. Beavers (Formerly Randolph & Beavers) Registered Patent Atty., 938 Columbian Bldg., Washington 1, D. C.

IF An Inventor believes he has an invention, a search of the most pertinent prior U.S. Patents should be made and a report obtained relative to its patentability. Write for further particulars as to patent protection and procedure and "Invention Record" form at once. No obligation. McMorrow, Berman & Davidson, Registered Patent Attorneys, 1433 Victor Building, Washington 1, D. C.

PATENT Protection—This well-known organization will supply inventors, promptly upon request and without obligation, a booklet containing detailed information concerning steps to take to protect their inventions by a U. S. Patent. Victor J. Evans & Co., Merlin M. Evans, Registered Patent Attorney, 441-E Merlin Building, Washington 6, D. C.

Copyrighted material

POPULAR SCIENCE OPPORTUNITIES

INVENTORS: Learn how to protect your invention. "Patent Guide" containing detailed information concerning patent protection and procedure together with "Record of Invention" form will be forwarded upon request—without obligation. We are registered to practice before the U. S. Patent Office and prepared to serve you in handling your patent matters. Clarence A. O'Brien & Harvey Jacobson. Registered Patent Attorneys. 92B-E District National Building. Washington. D. C.

PATENTS—Trade Marks. Patent Lawyer. Gustave Miller. 49B Warner Building. Washington 4. D. C.

PATENTS—Trade marks. Irving L. McCathran. 316 McLachlen Bldg., Washington 1. D. C. Registered Patent Attorney.

83 FOR INVENTORS

INVENTORS: Without obligation. write for information explaining the steps you should take to secure a Patent on your invention. John N. Randolph. Registered Patent Attorney. 206 Columbian Bldg., Washington 1. D. C.

INVENTORS: If you have an invention for sale, patented or unpatented, write Institute of American Inventors. Dept. 30A. 1926 Eye St. N.W., Washington 6. D. C.

INVENTORS. For "Record of Invention" form. contact Carl Miller. Registered Patent Attorney. Woolworth Building. New York.

"INVENTOR'S Guide" free on request. Frank Ledermann. Registered Patent Attorney. 154 Nassau St., New York 7.

INVENTORS: The usual First Step is to have a search of the U.S. Patents conducted, so I can report on Patentability. Write, without obligation. Patrick D. Beavers (Formerly Randolph & Beavers) Registered Patent Atty., 939 Columbian Bldg., Washington (1). D. C.

CASH For your idea. 280 manufacturers need inventions, patented or unpatented. List free. Invention Bureau, 208-S Clinton. Oak Park. Illinois.

INVENTORS: Learn how to protect your invention. "Patent Guide" containing detailed information concerning patent protection and procedure together with "Record of Invention" form will be forwarded upon request—without obligation. We are registered to practice before the U. S. Patent Office and prepared to serve you in handling your patent matters. Clarence A. O'Brien & Harvey Jacobson. Registered Patent Attorneys. 92A-E District National Building. Washington. D. C.

IF An Inventor believes he has an invention, a search of the most pertinent prior U. S. Patents should be made and a report obtained relative to its patentability. Write for further particulars as to patent protection and procedure and "Invention Record" form at once. No obligation. McMorrow, Berman & Davidson. Registered Patent Attorneys. 1432 Victor Building. Washington 1. D. C.

INVENTORS—This firm is registered to practice before the U. S. Patent Office and is available to assist inventors in the preparation and prosecution of their cases. "Patent Protection for Inventors" booklet containing detailed information and steps to take toward patent protection will be sent upon request. No obligation. Victor J. Evans & Co., 442-E Merlin Building. Washington 6. D. C.

PATENT Searches $5.00. Includes patent copies. 48 hour service. Free protection forms. Patent Service Institute. 945-B Pennsylvania Ave., Washington 4. D. C.

SELL your ideas without a patent. Eliminate expensive red tape. Do as the professional inventors do. Complete, proven information $1.00. W. H. Jones. 17763 Beach Drive N.E., Seattle 55. Washington.

INVENTORS: Save hundreds of dollars. Patent your own invention. Instructions, including Bristol Board for drawing, legal size copies of Petition, Oath, and Specification Heading. $2.00 Postpaid. Mr. Arthur Arruda. 70 Acushnet Avenue, New Bedford. Mass.

LIST your invention with Qualified Brokers. Write Elo Development Co., Long Island City 1. New York.

PATENTED. Unpatented. Inventions Promoted. M. Joyce Humphries. 1424 Landtitle. Philadelphia 10. Penna.

PATENT Searches $5.00. Includes nearest patent copies. 48 hour service. Free protection forms. Patent Research Engineering. 318 Evans Building, Washington 5. D. C.

INVENTORS—Make your patent search and obtain your patent yourself at home through our Circulating Patent Library and complete Patent Handbook. Disclosure unnecessary. Details free. International Patent Library. 1420 New York Avenue. Washington 5. D. C.

IDEAS and inventions, patented and unpatented, developed, financed and sold. M. Cash. 8750A Charlevoix. Detroit 14. Michigan.

84 INVENTIONS WANTED

CASH For your idea. 280 manufacturers need inventions, patented or unpatented. List free. Invention Bureau. 208-S Clinton. Oak Park. Illinois.

INVENTORS: Hundreds of manufacturers have requested our assistance in locating marketable new products. Complete information, free. Institute of American Inventors. Dept. 30C. 1926 Eye St., N.W., Washington 6. D. C.

INVENTIONS Promoted. Patented or Unpatented. Write Adam Fisher Company. 183-A Enright. St. Louis. Mo.

INVENTIONS Wanted. Patented or Pending only. Inventors Exchange-D. Hartford 1. Conn.

WANTED: Patented. Pending Meritorious Items. Charges from royalties only. Inventors-Manufacturers Associates. 5 Beekman St., New York.

SMALL Inventions wanted by manufacturers. I'll help you sell your invention. Write for circular. Stanley Hull. 7829 Euclid. Cleveland 3. Ohio.

PRODUCTS Research Foundation — is selecting new products, marketable ideas, designs, inventions for exploitation nationally. Is yours available? Write: Executive Secretary. Dept. A. Box 2106. San Francisco 26. Calif.

EARN Up To $2.000 year, inventing simple items. Special cash markets. Hendrickson. Argyle (2). Wisconsin.

85 PATENTS

INVENTORS: Test the commercial value of your patented or unpatented inventions, quickly and inexpensively. Write for free information. Institute of American Inventors. Dept. 30-B. 1926 Eye St., N. W., Washington 6. D. C.

88 MANUFACTURING

MODELS. Devices. Machinery: Designed. Built. Wolf. 21 Bedford St., New York City 14.

89 MODELS, MODEL SUPPLIES

MODEL Ship Builders! Are you looking for authentic, precision ship models? Send for richly illustrated fully descriptive catalogue in full color of famous ships of all kinds. Only 25c. Halesite Yacht Service Inc., Dept. C-49. Halesite. Long Island. N. Y.

MOST complete Illustrated Catalog—"O-HO OO" Model Railroad Parts ever published. Send 5c for mailing. Selley. 1377 Gates Ave., Dept. 836. Brooklyn. N. Y.

SHIP and Yacht model fittings; blueprints. Send 25c for illustrated catalog No. 21—Listing hundreds of items. A. J. Fisher. 1002-2 Etowah Ave., Royal Oak. Mich.

SHIP Models—most complete line in New England. Kits, parts, plans, books. Steam and electric power plants. Illustrated catalog 25c. James Bliss & Co., Inc., 220 State St., Boston. Mass.

BUILD Historic Ship Models, complete kits 39c to $9.00. Catalog 10c. Ideal Models. 21 West 18th. New York 11. N. Y.

CATALOG Illustrating Largest Assortment Ship Model Parts Send 5c. Selley Boats. 1373 Gates Ave., PS. Brooklyn. N. Y.

SHIP Model and yacht supplies, complete large 64 page catalogue. 30c. Wm. Wild. 510 E. 11th St., New York City.

BRASS Gears and model supplies for the inventors. Send 10c for catalog. Pierce Model Works. Tinley Park. Illinois.

STEAM engines, boilers, castings. Catalog 25c. Anton Bohaboy. 2297 Price. Rahway. New Jersey.

MODELERS catalogs! Ships, kits fittings catalog. 164 pages with money back coupon 35c. Controlog-100 u-control gas planes 10c. Trix twin H.O. tinplate trains 12 pages 15c. Jetex-Jet engine booklet 5c. Modelcraft. 314 S59 Fifth Avenue. New York 1.

MODEL Supplies for Craftsman, Hobbyists, Inventors. Send for illustrated catalog containing useful engineering information. Sola. 1142½ El Centro. Hollywood 38. California.

SHIPMODEL kits and fittings of highest quality. Send 15c for 1949 catalog. Model Shipways. Folio 45. 476 Main St., Fort Lee. N. J.

RAILROADERS. 50c gets new 1949 Catalog. Reference Manual. State O or HO gauge. Walthers. 269 Erie. Milwaukee 2. Wisconsin.

90 MOLDS AND MOLDING MATERIALS

RED Seal Rubber Company Develops New Compound! Genuine Natural Latex Base! Fully Guaranteed! Introductory Offer for $3.00—Complete Mold Making Course plus Quart of Red Seal Latex! Free Literature upon request. 116 Nassau St., New York 7. N. Y.

91 HOME CRAFTSMEN

LEATHER Craft Supplies. New 1949 illustrated catalogue. 84 pages showing thousands of items for the leather-crafter. Leathers, copper, tools, supplies, designs, patterns, books, and ready cut projects. Send 10c today to cover handling charges. Russo Handicraft Supplies. 245 South Spring Street—Dept. PS-5. Los Angeles. Calif.

LAWN chairs, garden figures, furniture, novelties, toys, etc., 68 popular plans with full size patterns. $1.00. Mastercraft 5S1. 7041 Olcott. Chicago 31. Ill.

LUMBER For home craftsmen and boat builders. Write Forest Products Company. Box 341. Binghamton. New York.

BANDSAW. Jigsaw owners, let your machine bring extra profits, fun. Free details. Nu-Art. 34 Rosemont. Weymouth 91. Massachusetts.

CATALOG: Patterns plywood novelty furniture, lawn ornaments, letters, numerals, plaques, frames, silhouettes, weathervanes, toys. Decal transfers. Over 100 other items. 200 articles illustrated. 25c. refunded first order. (No stamps please). Wo-Met Shop. Box 167. Ashburn. Georgia.

LEATHERCRAFT! Complete stocks of leathers, tools, supplies. Immediate shipment. Free catalog. Kit Kraft. Dept. 3203 W. Washington Blvd., Los Angeles 16. Cal.

ALL Purpose Plastic Metal Mender for home, farm, auto. Outstandingly better. 1½# Can only $1.20 Postpaid. Charles Doettrel. 306 Maple. Buffalo 4. New York.

REBLUE your own rusty firearms or operate shop complete instruction. $1.00 Money Order. Emil Krez. 2401 W. 9th Street. Los Angeles 6. Calif.

HANDICRAFT Supplies—Tools. Plastic. Metal. Leather. Catalog Free. Kale Crafts. 2250 Milwaukee. Chicago 47. Ill.

JUMBO box world's finest genuine leather. Pigskins, Alligators, Lizards, Ostrich, Cowhide, many other varieties, assorted. 20 lbs.—$5.00. 10 lbs.—$3.00. Satisfaction guaranteed. Order today. Leathercrafters. Box 11-B. Lake Bluff. Illinois.

OUTDOOR Fireplaces. Plans on Fifteen Different. dollar bill. Craftplans. 7241-S Madison. Kansas City 5. Missouri.

ELECTROPLATING Units—Complete sets. Copper, nickel, cadmium $1.50. silver $2.00. gold $4.50. Write for free literature. Regency Sales Co., 5316 So. Justine St., Chicago 9. Ill. Dept. 1-A.

SAVE Thousands building your own home. Practical 47-lesson home-study course explains home-building A to Z. Includes plans and specifications for 6-room house. Others using with great success. Big 22-page book sent free. Commercial Trades Institute. Dept. DC1-5. 1400 Greenleaf Avenue. Chicago 26. Ill.

SENSATIONAL new pocket tool for the Craftsman and Model Maker. 7 tools in 1. Write today! Craftsmith. 15427 Robson. Detroit 27. Michigan.

Copyrighted material

POPULAR SCIENCE OPPORTUNITIES

CHAIR Cane. Genuine Plastic. Samples —Dime. Fogarty Caner. Troy. New York.

MAKE Money—Have Fun! Join America's fastest growing club. New Handycraft Kit every month. Send $1.00 Today For Kit Of Month and membership information. Fun and Profit Club. 150 East 52nd Street. New York 22.

FOAM Rubber: Luxuriously soft lifetime foam rubber now available to home upholsterers in easy-to-cut standard sizes, fabricated from new remnants. Low prices: 12" x 12" x 1" $1.49; 15" x 15" x 1" $1.69; 18" x 18" x 1" $2.98. Other sizes on request. Postpaid in U.S.A. with free instructions. Dealer inquiries invited. Home Foam Company. 232 Ellsworth Avenue, New Haven 11. Conn.

TROPICAL woods, six different species. $1.00 postage paid. B. Lurie. Box 892, Coral Gables. Florida.

CELLULOID—Beautiful assortment. Mottles, opaques, onyx, pearls. Used by ring makers everywhere. One pound assortment—pieces approximately 30 sq. in. each. Price $1.00. Please add 10c for postage. Craft Service. 337 University Avenue, Rochester 7. N. Y.

TURN your workshop into cash. Send postcard for catalog of modern saleable projects. Craftplans, 7241-S Madison. Kansas City 5. Mo.

COPPER and Brass Materials. Complete line for Craftsmen and Workshops. Catalog Free. Groundmaster Company. Boulder. Colorado.

SPECIAL 80 Full Sized Patterns. Lawn Ornaments. Toys and Novelties. $1.00. Modern Woodcraft. Saginaw. Mich.

KNOCKDOWN Cedar Chest. Lumber and Veneers. Free Price List. Giles Co., Brownsboro. Alabama.

93 BUILD IT YOURSELF

ROTARY power mower kit. Big savings! Free circular. Giro Power Co., Lohrville 2. Iowa.

DESCRIPTIVE Plans of Easy Blueprints for Home Owners. Farmers. 25c. Details Free. Dealers Wanted. Edman, Box 307 U. New York 19.

BUILD at home. Inexpensive, practical Concrete block machine. Motor or hand. Write. Clyde Lee. Mountain View 1. Okla.

MAKE your own handy lightweight Concrete Blocks quickly with new Blockmaker. Circular stamp. Manual 25c. Peerless. New Lenox 1. Illinois.

"CONCRETE Block Homes." 32 page booklet on how to build. $1.00. Other Home Building booklets. $1.00. H. C. Lightfoot, Civil Engineer. Richboro. Penna.

94 WATCH REPAIRING

WATCHMAKERS' Tools. Supplies Sold—Bought. Catalogue! Bengale Company. Culver City. California.

WATCHMAKERS' Journal Contains helpful hints on watch repairing. Sample copy 15c. Dean Co., 116-B Nassau St., New York 7. N. Y.

CLOCKS—Watches buy, sell, trade, repair. Steeple to the smallest, new or old. A. McCollum. Box 550. Farmington. Mich.

95 OLD GOLD, WATCHES, ETC.

HIGHEST Cash for old, broken jewelry. Mail Gold Teeth, Watches, Rings, Silverware, Diamonds, Spectacles. Satisfaction Guaranteed. Free Information. Rose Smelting Co., 29-Y East Madison. Chicago.

96 JEWELRY

JEWELERS supplies, findings. Latest catalog. 10c. George Sassen, 154 Nassau Street. New York 7.

SEND US $1.00—and receive one attractive jade stone finger-ring. Discounts to wholesalers. Many other offers. South China Overseas Trading Corp., Post Box 2112. Hong Kong. China.

MAKE Your Own Jewelry! All types of findings, plastic and metal; cameos, beads, shellkits, illustr. catalog. 20c. Hobby Art, Dept. 6. POB 276. New York 18. N. Y.

97 TOBACCO & PIPES

CIGARETTES $1.50 carton 3 or more postpaid. $1.53. 5th zone up. Cigarette Sales. 1122 E. 31st. Kansas City. Mo.

CIGARETTES—Popular brands $1.50 per carton postpaid. West of Mississippi add 8c per carton. Min. order 3 cartons. Send check or money order. King Co., Box 569E. Dover. Delaware.

PIPEMAKING kits $1.00. Briar blocks, stems, carnauba wax, screws. Free literature. Carvapipe, 2829-F Dixie. Hamilton, Ohio.

98 RAZOR BLADES, SHAVERS

RAZOR Blades. 100 for $1.00. Double edge. Money back guarantee; also agents wanted. Gotham House. 1216 Park Row Bldg., N. Y. C.

100 MISCELLANEOUS

BOOKFINDERS! (Scarce, out-of-print, unusual books) Quickly supplied. Send wants. Clifton, Box 1377-PSM. Beverly Hills. Calif.

BARGAIN Catalog. 10c. Values galore. Tiptop. Box 9083 PS. Dallas. Texas.

FIRECRACKERS Wholesale—1.920 highest Quality 1½" Chinese Firecrackers—80 dime packages of 24 ($8.00 value) $3.50. Super Fireworks. Dept. 3. St. Helen's. Ore.

RAISE ginseng. Roots bring $10.00 pound. Circular free. Fezler Seed Co., Patchogue. New York.

GOOD jobs and a Sound Substantial Future await you in hotel and institutional field. Men and women—all ages—needed for well-paid positions that offer color, excitement, ever new and fascinating duties. Record breaking travel means even greater opportunities for trained men and women in hotels, clubs and institutions. Lewis School receiving calls for managers, assistant managers, stewards, hostesses, purchasing agents and 55 other types of important positions! From coast to coast there are important positions that offer splendid opportunities for advancement in a business where you are not dropped because you are over 40. Previous experience proved unnecessary! No need to leave your job to qualify. A good grade school education, plus Lewis Training qualifies you at home, in spare time. Our National Placement Bureau helps to place you—and our amazing Certified Job Plan—actually certifies you will "make good" when placed. Write today for Free book! Veterans: Course approved for Veterans' Training. Lewis Hotel Training School. Room PE-2768. Washington 7. D. C. (First and only School of its kind—now in its 33rd year.)

BIG Men Only: Quality shoes, sizes 10 to 16. Widths AAA-EEE. Dress, work, hand woven shoes, loafers, moccasins, wing tips, sox. Guaranteed. Write for Free catalog. King-Size. 887 Brockton. Mass.

SUCCESS in Life-Love-Business! Know your Powers! Personal handwriting analysis $1.00. A. Rockwell, 3833 N. Berkeley, Silverton, Ohio.

"FIREWORKS—Firecrackers". All Kinds. Send for free price list. Nelson Fireworks Co., Montello. Nevada.

"INTERESTING Mails." 25c will keep your mail box full for three months. Bentz. Jr., Chatawa 42. Mississippi.

BIG Mails Three Months. Name Listed Directory 25c. Harvey Teeple. Decatur, Indiana.

TREASURE Locators, Mineral Detectors. Geiger Counters for Uranium ores. Free literature. Fisher Research Laboratory. Inc., Palo Alto. California.

URANIUM Prospector's Handbook $1. Non-technical. Guaranteed. Craft-Connor Publishing Company. Dept. C. 601 S. Vermont. Los Angeles 5. Calif.

GEIGER Counters! New, lightweight, super sensitive uranium detectors. Sensational low price. Write today. The Detectron Co., Cole Branch, P. O. Box 8683, Los Angeles 46.

SPONGES, large natural deep sea sheepwool, for washing autos, walls. $1.00 Postpaid. Gardner Sponge Co., Box 1082, Miami. Florida.

CALIFORNIA Opportunities, working conditions, housing, etc., $1.00. G. E. Middagh. 2378 Sutter Street. San Francisco. California.

TIRED of your ties? Send 6 and $1.00. Receive 6 equal quality. Color pref. Tytrader. Box 4287. Portland 8. Oregon.

DOG & Key Tags. Free List. Dow Mfg. Co., Dept. PR. West Lebanon. N. H.

GIANT Balloon—target type red rubber Air Corps Balloon. Inflates up to 45". Only $1 at Surplus Distributors. 924C N. Plankinton. Milwaukee 3. Wisc.

FIREWORKS-Robin Hood Chinese Crackers; 80 packages (1.280 total) for $7.50. Express Prepaid. Get catalog. Frank Patterson. Hawesville. Ky.

COCONUTS off Palms in husks. $2.00. Lind. 2484 Prairie. Miami Beach. Florida.

PANNING Gold—Free instructions. Catalogue mining books—supplies. Old Prospector. B-243. Dutch Flat. Calif.

WHIPPED Cream dispenser; pint makes ½-gallon. for sundaes. $17.50. Literature free. Domonkos. 98-B5 Vermont. Newark 6. New Jersey.

FOOL Your Friends!!! Letters remailed from New York City 25c. Mills. 457—2nd Ave., New York 10.

101 FOR SALE—MISCELLANEOUS

WAR Surplus. Aircraft items. Shop Equipment. Machinery and a million other items. Free Catalog. Atlas Equipment. 229 Southwest Blvd., PS., Kansas City 8. Mo.

BRUSHES. Small Paint, Varnish, Lacquer, etc. War Surplus. 25 for $2.00. Postpaid. Elgene Company. 9015 5th Ave., Brooklyn 9. N. Y.

MONOGRAMS. Car. Boat. Six 1½" to 2". Gold Letters or numbers $1.00. Appleton's. Anoka 3. Minn.

FREE Catalog! War Surplus Clothing Bargains! Men's, Women's. New York Clothing Co., 2079-B. New York 29.

DO you carry keys? Sure! Send $.35 for unusual, genuine leather key and coin case. Surprise Sales. Box 112. Knickerbocker. New York 2.

AMMONIUM Ion Toothpowder. Revolutionary. Free information. Service Specialty. Box 2225. Portland 14. Oregon.

PLASTICATED "GI" Cloths. Waterproof, lightweight, 8 x 10 foot. 1001 uses as painter's dropcloth, lawn, furniture, machinery, merchandise cover, beach blanket, or shelter. Many uses camping, fishing, or picnic trips. Send $1.25, and we will ship one cloth prepaid. Sax-on. Dept. 370. 3840 Fullerton. Chicago 47. Ill.

RESURRECTION Plants Wonderful Novelty. 3 x 50c. Coin only. Springer's. El Paso. Texas.

102 WANTED MISCELLANEOUS

MERCURY—Highest prices. Free Containers. Write Mercury Terminal. Norwood. Mass.

I HAVE Swappers—Buyers—Sellers for anything. Free lists. Toole. Box 415. Evansville. Indiana.

103 FOR THE HOME

FREE paint brush. Write for details. Kwik-Eze Mfg. Co., Grand Haven. Mich.

SWISS Music Box Movements. Suitable for many novelties. Over 200 tunes to choose from. $1.00 to $3.50. Also complete line of Swiss musical novelties. Send for circular and literature. Bell Music Box Company. Box 49. Planetarium Station, New York 24. N. Y.

104 PERSONAL

How You can find out! Information discreetly developed. Any matter, person, problem, anywhere. Personal-Business assignments, representations undertaken. Nationwide. Officially licensed, bonded service. Established 1922. Reasonable. Confidential. William Herman. 170 Broadway, New York.

RUPTURED? Positive comfort, no understraps, no steel, no elastic. Write Smith Manufacturing Co., Preston. Ontario.

PSORIASIS Sufferers: Has everything failed to bring even temporary relief from scales, lesions and itching? Then write today for Free important information. You needn't invest one cent! Pixacol Company, Dept. S. Box 3583. Cleveland. Ohio.

SLEEPLESS? Try Sleep-rite Earstoppers. Set free. Raymond Dow, 2922—164th, Flushing 20. N. Y.

HAIR Falling? Dandruff? Write Elson, 139 Lewis Street, Phillipsburg, N. J.

Copyrighted material

INFORMATION for single people by Human Relations Consultant. University Graduate. Dr. B. Long, Box 375, Los Angeles 53, Calif.

FOREIGN Country, Letters Remailed from Canada. 30c. Four—$1.00. Howard Hasson, 22758 Hoover, Van Dyke, R-2, Michigan.

SLEEP Without Drugs. Write for free information. The Slumber-Tone. 12314 East Outer Drive. Detroit 24. Michigan.

BE A Leader! Learn the secret of influence and success. "Priceless Personality" has already helped thousands, 27 revealing chapters. Send just $1. Mountain Book Company, 1024 Lafayette G St., Denver 3, Colorado.

STUTTERING, Bed-Wetting, Family and Marriage Problems, Shyness, Fear, can be overcome with the aid of books suggested by our panel of medical and psychological experts. Write your problem for free individual suggestions. Psychological Reader's Association, 505-B West 23rd St., New York 11, N. Y.

MEXICAN Law. General Practice Attorney. 1203 Arizona Street, El Paso, Texas.

MAGILLS' B-Complex Vitamins. 3c stamp and this ad brings 7 day sample supply. Magill Vitamin Company, Drawer 430-PS, Springfield, Missouri.

FREE if troubled with Dandruff, Dry, Thinning Hair; helpful Booklet, prompt relief. Regime Counselors, 9-Z South Clinton, Chicago 6.

DAV Contestants! Compare highest possible score obtained scientifically, with yours. Write: Box 3583, Cleveland 18, Ohio.

PRIVATE Consultant for personal problems. Box 252, Conrad, Iowa. $2.00.

PSYCHIC Magazines. American, English, Australian. 2 back dates Psychic Observer 25c. List Free. Bobbitt, 1609—10th Avenue North, Dept. 39, Nashville 8, Tennessee.

RECEIVE Magazines. Mail. Samples. Your name listed 10c. Sibley, Mendon, Mass.

MIAMI Beach Postmark! Letters 25c each. Lind, 2484 Prairie, Miami Beach, Fla.

HAIR thin, falling, dandruff? Getting Bald? Amazing results! No liquids, greases, gadgets. Write Life System, 325-P.S. N. Western, Los Angeles 4, Calif.

CONFUSE Your Friends!!! Letters remailed from N. Y. C. 25c. Mills, 457—2nd Ave., N. Y. C. 10.

106 ADVERTISING

AVOID costly advertising mistakes. Get enlightening Ad-Guide and Ratebook leading newspapers, magazines, mailing lists. 10c. Chicago Advertising Agency (Established 1900), Chicago 4.

24 WORDS in 50 Weeklies. $4.96. J. Darnell, 730 Hays, Jackson, Tennessee.

WRITE successful sales letters. Home study course. $2.00. Satisfaction or money back. Wallace Power, 923-c W. Vine, Kalamazoo, Michigan.

SOUTHWEST—24 words in 40 weeklies. $3.50. M. Pennebaker, San Marcos, Texas.

ADVERTISE: 24 words, 40 Newspapers. $3.50. Lists Free. Advertising Bureau, 10511-P Springfield, Chicago 43.

109 HANDWRITING ANALYSIS

YOUR handwriting individually scientifically analysed. $1.00. Box 479, Goodyear, Arizona.

113 DRAFTING

NOTICE Drafting Students! Learn by copying! Roof Truss Print 24"x36". Price $1.00. Try The Bentz Method, 4830 Poppleton Avenue, Omaha, Neb.

115 DRAWING & ART SUPPLIES

DRAFTING and artists' materials catalog—thousands of items—25c (deductible first $2 order). Gordon's, 187 Madison, Chicago.

120 CANDY MAKING

MEN-Women — "Most Everybody Likes Candy." Learn to make in a professional manner at home. (Our 39th. year.) Ragsdale Candies, East Orange, N. J.

126 CAMPING

CAMPERS: Make your equipment. Plans for table (suitcase folding) 50c. Price list for others. C. Martin, 309 E. 19th St., Brooklyn 26, N. Y.

131 TREASURE FINDERS

METAL Detectors. The Very Latest Circuit. Free Literature. Hedden Metal Detectors, 3329 Liberty St., Pittsburgh 1, Pa.

TREASURE-Mineral Locators. M-Scope. Low Priced, lightweight, unsurpassed in efficiency. Revolutionizes locating of minerals and precious metals. Geiger Counters for Uranium ores. Time payment plan. Factory guaranteed. Free 16-page booklet upon request. Fisher Research Laboratory, Inc., Palo Alto, California.

TREASURE Hunters! New 11-pound featherweight Model 101 locator for gold, silver and minerals. Money-back guaranteed best available. Also Geiger Counters for uranium prospectors. Complete information free. The Goldak Company, 1544 West Glenoaks Blvd., Glendale 1, Calif.

SEEK Buried treasure; Methods, mysteries, devices explained. Circulars free. Century Press, Box 151-D, Glen Ellyn, Ill.

137 DETECTIVES

DETECTIVES—Work home—Travel. Experience unnecessary. Write Wagoner P-125 West 86th, N. Y., N. Y.

DETECTIVE Training. Phillips Secret Service System, 1917C North Kenneth, Chicago 39, Illinois.

142 INFORMATION

WHERE-To-Buy-It Information; most products, material or equipment, $2.00 per item; manufacturer or wholesaler. Send No Money. We trust you. Pay on approval. State wants. One day airmail service. Donald Kelly, AN-9544 Whitcomb, Detroit 27, Michigan.

143 NAME LISTS

MAILING lists; most classes. 1000 $5.00. Free Prospectus. Dixie Service, King, N. C.

2,500 SALESMEN & Agents—$7.50. 1949 list. W. Nothern, Lake City, Arkansas.

145 SOUVENIRS

30 DIFFERENT military emblems, American and Foreign, 50c and catalog free. Prices and sample, 10c. Hobbyguild, 57X Summer Ave., Brooklyn, N. Y.

SEND 25c for beautiful souvenir from Atlantic City "The World's Playground". Free circular. General, 910 Atlantic Avenue, Atlantic City, N. J.

NEW exciting souvenir map of Catalina Island 4-color suitable for framing. Guaranteed satisfaction. Now! 25c, send coin. LCB, Box 146, Avalon, Calif.

DRAINS CELLARS, WASH TRAYS CIRCULATES OIL

Pumps 1800 GPH 300 gal. 30' high, uses ⅛ to ⅓ HP motor. Will not clog. **$6.50**

Postpaid if cash with order.
(Add 50c for west of the Mississippi.)

Thousands in use since 1936

LABAWCO PUMPS, BELLE MEAD 3, N. J.

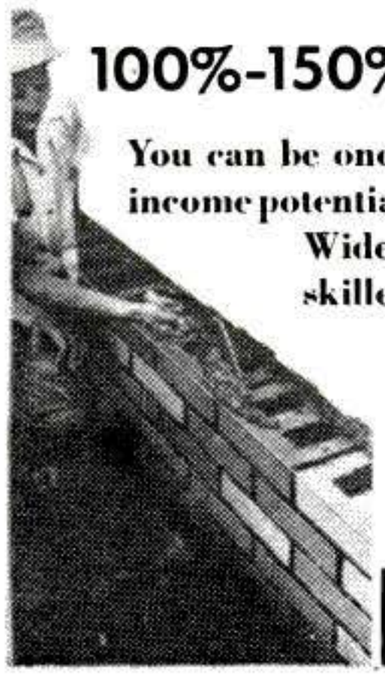
SPEED AND POWER HANDBOOK

Very latest methods! Build your own Dual Manifolds, Superchargers, "Water Injectors," Hi-Compression Heads, Fuel Saving Devices—easily. **SAVE MANY DOLLARS!** Get racing speed, acceleration, dynamic power increases from any automobile! Build fast Stock Cars! California Roadsters! Hotrods! Get Construction Diagrams! Ingenious Formulas! Speed Secrets! Also **"Economy Information"**—Mileage Tricks! Conversion Ideas! Tuning Techniques! Picture Catalogues. Plans! Drawings! Including **"California Restyling Ideas"**—Glossy photographs! Plexi-Tops! Model Revising! Streamlining! Customizing!—**$1.98** complete.

NEWHOUSE AUTOMOTIVE INDUSTRIES, 5805-A4 EAST BEVERLY, LOS ANGELES 22, CALIF.

Growing Demand Requires More Local Plants

Here's an outstanding manufacturing opportunity for men with vision, energy and a little capital. Brikcrete is sweeping the country because it has beauty, long life and ultra comfort. Truly the world's most modern masonry. Distinctively different. Yet costs less than lumber because it is locally manufactured of local materials by local labor for local building needs.



100%-150% Mark-Up on Costs

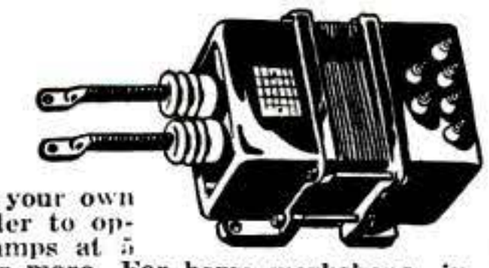
You can be one of a national chain of local plants. High income potentials. Can be started on moderate investment. Wide-open market. Requires no experience; no skilled labor. We supply all equipment. Easy terms, if necessary. We work with you to put it over. Write for Brikcrete Book No. 2 and tentative reservation of territory.

Brikcrete Associates, Inc.
4675 S. Division Ave., Grand Rapids 8, Mich.

BRIKCRETE

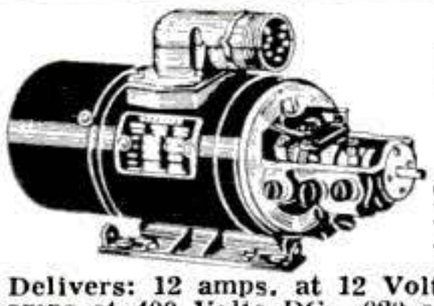
Build Your Own SPOT WELDER

With This Brand New Transformer Unit $18.95



Perfect as the basic unit for building your own low voltage, high amperage spot welder to operate on house current. Output, 190 amps at 5 volts. Momentary output, 1000 amps or more. For home workshops, industrial plants, garages. Hundreds of other uses. Original gov't cost $160. Make a professional Spot Welder out of your drill press or any type of press without conversion. Plan and welding information furnished FREE! Shipping wt. 100 lbs.

COMPLETE PICTURE INSTRUCTIONS AND PLANS, alone (including information about new Supreme Spot Welder Kit). 10c



Generator POWER SUPPLY

Brand New! Amazing Value $4.95

Generate direct current easily with the high grade unit for operating model railroad war surplus motors, radio plate voltages, plating or test work. Delivers: 12 amps. at 12 Volts DC, 6 amps, at 24 Volts DC, .135 amps at 400 Volts DC, .020 amps, at 800 Volts DC, 1.12 amps. at 9 Volt AC. Mfd. by Wincharger. It's simple. No wiring to do. Generator comes complete and assembled. All you need is any AC motor 1/6 HP or more, two pulleys and a V belt to drive it. The precision belt ball bearing generator cost the Gov't over $100. It's yours for only $4.95. Add $1.35 each for postage and handling.

Complete PE-101-C Dynamotor as used on BC-645 $6.95

ORDER DIRECT FROM THIS AD. Send check or M.O. Add mailing charge. Transformer shipped fast freight collect. Satisfaction Guaranteed or Money Refunded.

ELECTRONIC SALES CO., Dept PS-3
3923 VAN BUREN CULVER CITY, CALIF.

Copyrighted material

STUDY AT HOME

With An Educational Institution

Men with specialized training win higher positions, insure larger earnings, and are bigger successes in business and public life. Opportunities NOW greater than ever before. Send for our Catalog.

ARTS and SCIENCES

Courses in Philosophy; Education; Letters; Public Health; Medical Jurisprudence; Psychology; Sociology; Physics; Chemistry; Plastics; Geology; Political Science; Theology; Business and Commerce; Accounting; Mathematics; Statistics; Agriculture.

ENGINEERING

Courses in Electrical, Civil, Mechanical, Drafting, Architectural, Steam, Aeronautical, Radio, Structural, Mining, Industrial, Petroleum, Marine, Chemical, Diesel, Automobile, Refrigeration, and Air Conditioning Engineering.

LAW

Complete Professional Law Course includes 18 Hornbrook Series college grade textbooks. Courses also in Commercial Law, Patent Law and Medical Jurisprudence.

McKinley-Roosevelt Incorporated, 4610-AB, Sheridan Rd., Chicago 40, Ill.

AMAZING MYSTERY BUTTON

Startles Everybody. With this *Electronic Button* you can make your own Telephone-Amplifier-Dectectiphone. Attach this button to piece of cardboard—transmit conversation to another room. Music also transmitted to distant places. Most interesting electrical apparatus ever discovered. Enables you to perform hundreds of experiments. So tiny it can be concealed in dozens of places. A Pre-War Product. Electronic Button including 5000 word instruction booklet with 50 illustrated experiments, postpaid, only..... **$1.00**

ELECTRONIC PRODUCTS COMPANY, SAINT CHARLES 8, ILL.

EYE-GLASSES BY MAIL

16 Days Trial

Write Today for Free Catalog. Send no Money

ADVANCE SPECTACLE COMPANY

537 South Dearborn Street, Dept. SP-5, Chicago, Illinois

Become a Doctor of PSYCHOLOGY

Win the degree of Ps.D. Teach the secret of contentment, happiness. Solve mental worries. Experience the revelation of truth. Chartered college. Individual help. Write for FREE book. **COLLEGE OF UNIVERSAL TRUTH, 5153-A North Clark St., Chicago 40, Ill.**

ELECTRICAL TRAINING

Intensive 32 weeks residence course in fundamentals of industrial electrical engineering, including radio, electronics. Prepares for technician, engineering aides. Approved for veteran training. 56th year. Enter September 6, January 9. Catalog.

BLISS ELECTRICAL SCHOOL
7608 Takoma Ave., Wash. 12, D.C.

BUILD YOUR OWN ENLARGER

Enjoy Photography's most fascinating hobby at a fraction of usual cost. With simple step-by-step instructions and diagrams plus a screwdriver and pliers you assemble your own Enlarger and Save! Get all features of more expensive Enlargers: precision machined aluminum alloy castings, 90° tilt for wall projection of prints, spherical aluminum lamphouse, helical rack and pinion focusing with extra large knobs, unconditional guarantee. For 35mm to 2¼x3¼ negatives. Time payment plan.

Write Today for Free Illustrated Folder

CALIFORNIA TECHNICAL PRODUCTS CO.
448 So. Hill, Dept. K-5, Los Angeles 13, Calif.

Train Now in Spare Hours at Home for a Better Job at Better Pay in...

REFRIGERATION and AIR CONDITIONING

1. FIRST: You get vital basic knowledge at home—during spare hours. Train as fast or as leisurely as you like.

2. THEN: You come to ITI's giant shops in Chicago—for a Full Four Weeks of practical instruction and actual work on newest, most modern equipment.

RICH Rewards for the Trained Man

Now is the time to lay your plans for a better job at better pay! Get the facts about your future in the amazingly FAST GROWING field of Refrigeration, Air Conditioning and Heating! Men who know how to install, repair, rebuild and maintain this equipment are going ahead FAST! But many more fine jobs are open NOW in this rapidly expanding industry in both the home and commercial equipment fields. Experts say the opportunities are almost unlimited . . . BUT ONLY PROPERLY TRAINED MEN CAN QUALIFY FOR THE BETTER PAYING JOBS!

Investigate the Industrial Training Institute's 2-Way Course in Refrigeration, Air Conditioning AND Heating. In a few months this training gives you solid, practical, down-to-earth knowledge and experience you need. You don't need any special schooling or experience to master the ITI course. It's so simple, easy and practical that you can finish your Training in a short few months' time. And after completing your Training ITI's wonderful job placement service is available to you without extra cost!

TRAINING MEN FOR INDUSTRY SINCE 1916!

ITI Training is backed by more than 30 years of success and experience. We have given training to over 400,000 men since 1916. Today thousands of ITI graduates hold down top paying jobs. ITI occupies five large buildings, with over $500,000.00 invested in shops and training facilities. Instruction staff of more than 100 men.

VETERANS!

ITI residence training is fully approved under the G I Bill of Rights. Check coupon for special veterans' bulletin.

THIS BIG BOOK FREE!

Find out about ITI Training. See for yourself how easy and simple it is to start at home, in your spare time, and prepare yourself for a fine job with a real future. It's all in ITI's fascinating, illustrated FREE book, "Your Future in Refrigeration & Air Conditioning." Just fill out and mail the coupon below NOW! Take this first step toward success TODAY!

INDUSTRIAL TRAINING INSTITUTE
Dept. T-2
2150 Lawrence Avenue, Chicago 25, Ill.

INDUSTRIAL TRAINING INSTITUTE
2150 Lawrence Avenue
Dept. T-2, Chicago 25, Ill.

Please send me FREE the ITI book, "Your Future in Refrigeration and Air Conditioning" and information about the opportunities for trained men in this fast growing field. I understand I'm under no obligation.

Name.....Age.....

Address.....

City.....Zone....State.....

Are You A Veteran?.....

Copyrighted material

MADE $14 PER DAY
While Still Learning

"By the time I finished half your course, I was making $14.00 per day. I have made enough on the side to more than pay for the course—" **T.E.H.—West Virginia**

LEARN ELECTRIC APPLIANCE

We Teach
How to Repair
Washing Machines
Vacuum Cleaners
Electric Ranges
Lamps, Motors, Irons, etc.
REFRIGERATION and House Wiring
At Home In Your Spare Time!

REPAIR & SERVICE

For a man handy with tools, and happiest when working with his hands, OPPORTUNITY is Wide Open Today in this great and growing field. Everyone is a customer for the man trained to service electric appliances.

OPEN YOUR OWN SHOP

Our practical HOME COURSE teaches you this business from A to Z—preparing you to take a well paid job or open your own shop. You can actually start in your basement or garage with the tools we send you . . . before finishing.

We Include An ELECTRICAL APPLIANCE TESTER
A Big Kit of Tools at NO EXTRA COST

MAIL THIS COUPON for FREE BOOK

PACIFIC TRAINING SCHOOL
7217 So. Broadway, Dept. S-95, Los Angeles 3, Calif.
Dear Sirs: Please send me, without obligation, your free booklet and complete details.

Name.....
Address.....
City.....*State*.....

FREE

Send today for this big book of values in

TELEVISION

RADIO, ELECTRONIC, INDUSTRIAL, SOUND & AMATEUR EQUIPMENT

NEW 1949
NEWARK CATALOG

No matter how tiny the part, how tremendous the system . . . it's listed in this mammoth catalog . . . over 20,000 items including everything in Standard Brand equipment! The most complete essential reference book for pros, hams, hobbyists, novices, oldtimers . . . everyone interested in TV, radio and sound equipment!

24-HR. MAIL ORDER SERVICE
ONE YEAR TO PAY

148 pages packed with pictures, charts, and vital information

KITS! SETS! PARTS! ACCESSORIES!

3 GREAT STORES!
115 West 45th Street
and Downtown at
212 Fulton Street
NEW YORK

323 W. Madison Street
CHICAGO

NEWARK RADIO & TELEVISION

Newark Electric Co.
242 W. 55th St., NYC

MAIL COUPON NOW!

Dept. E-16 Please send FREE Newark Catalog to:
NAME_____
ADDRESS_____
CITY_____ STATE_____

Plastic Coasters and Tiles

EMBED REAL FLOWERS in *NEW* Magic PLASTIC

Now, create many unusual things like the distinctive pansy coaster shown—made by embedding real pansies in Castolite—the "magic" liquid plastic that "pours cold like honey . . . sets like glass" . . . at room temperature. Comes crystal clear or may be dyed for brilliant color effects. Embed other flowers, too, also coins, butterflies, medals, etc. Make really different jewelry, candlesticks, picture frames for gifts or to sell.

POUR GORGEOUS BOOKENDS

Castolite makes it easy to cast exquisite bookends like the one shown. Make duplicates of hundreds of art objects, figurines, etc. No special artistic ability needed. With new, easy-to-use Castomold you make your own molds in minutes. Use only home utensils. Follow simple step-by-step method. New pleasure, fine profits are possible.

EMBED YOUR PHOTOS

Preserve treasured photos in Castolite. Make beautiful medallions like the one shown, unusual photo lampshades, lamp bases, paper-weights with embedded photos. Send 25c for new Instruction Manual, packed with pictures showing how to get started.

MANUAL 25¢

Dealers write today.
The Castolite Co.
Dept. E-4
Woodstock, Illinois

Trained Men Get the Better Jobs
PRACTICAL SHOP TRAINING
in AUTOMOTIVE MECHANICS BODY and FENDER REBUILDING

If interested write or wire
ATLANTA MOTIVE TRADES INSTITUTE
Dept. C 254 IVY St., N.E. Atlanta, Georgia
Member of the Southern Association of Private Trade Schools
Veterans ask about G I Training

LAW FREE BOOK

Your **FREE** copy of **"The Law-Trained Man"** shows how to gain prestige and greater earnings through Blackstone home law study. All instruction material furnished including 18-volume Law Library written by 65 well-known law authorities. Lawyers, judges among our graduates. LL.B. degree. Low cost; easy terms. Write today.

BLACKSTONE COLLEGE OF LAW 225 N. Michigan Ave. Dept. 125, Chicago 1, Ill.
A Correspondence Institution Founded in 1890

THEY'RE SUPER SCOPES!

36" 17 POWER

Extends to 36 inches. Precision and Polished Lenses. Ideal for Studying Stars, Plane Spotting, etc. Satisfaction Guaranteed or Money Refunded. Send Check or Money Order to

$2.95 Post Paid

CRITERION CO., Dept. PS-3
438 Asylum St. Hartford 3, Conn.

Build YOUR OWN BOAT

Complete parts cut to exact size—ready to assemble. Marine waterproof plywood, rustproof oarlocks. Ideal for car top. Also models with laminated frames; mahogany decked runabouts. Build for sale at attractive profit. Exclusive franchise to local builders. Send 10 cents (dime) for illustrated literature.

$39.50 and up

OZARKA 759 WASHINGTON AVE. WOODSTOCK, ILL.

Copyrighted material

WOULDN'T TAKE $1000 FOR COURSE

"The lessons are so simple that anyone can understand them. I have learned to play by note in a little more than a month. I wouldn't take a thousand dollars for my course." *S. E. A., Kansas City, Mo.

PLAYS ON RADIO

"I can't keep from telling you that I have a good position playing from KTHS, Hot Springs, Ark., every morning."
*J. S., Okla.

PLAYS AT DANCES

"The Piano course I'm taking is the 3rd course with your school. Previously I took Saxophone and Clarinet. Since then I've played a lot of dance jobs."
*E. A., Lake View, Iowa

THOUSANDS NOW PLAY

who never thought they could!

You, too, can play any instrument by this EASY A-B-C METHOD

YOU think it's difficult to learn music? That's what thousands of others have thought! Just like you, they longed to play some instrument. But they denied themselves the pleasure—because they thought it took months and years of tedious study to learn.

And then they made an amazing discovery! They learned about a wonderful way to learn music at home—without a private teacher—without tedious study—and in a surprisingly short time. They wrote to the U. S. School of Music about this remarkable short cut method. A free print and picture sample actually showed them how easy it was to learn.

The result? Over 850,000 people have studied music at home this simple, A-B-C way. They have found the key to good times, popularity and profit

And that's what you can do right now. Simply mail the coupon. Get the proof that you, too, can learn to play your favorite instrument—quickly, easily, in spare time at home. Just read the fascinating illustrated booklet—examine the print and picture sample. Tear out the coupon now, before you turn the page. Instruments supplied when needed, cash or credit. U. S. School of Music, 85 Brunswick Bldg., New York 10, N. Y. 51st year. (Established 1898.)

**Actual names on request. Pictures by professional models.*

FREE! *Print and Picture Sample*

U. S. School of Music, 85 Brunswick Bldg., New York 10, N. Y.

I am interested in music study, particularly in the instrument indicated below. Please send me your free booklet, "How to Learn Music at Home" and your Print and Picture Sample. (Do you have instrument?.....)

Piano	**Piano Accordion**	**Reed Organ**	**Clarinet**
Guitar	**Saxophone**	**Tenor Banjo**	**Trombone**
Violin	**Trumpet, Cornet**	**Ukelele**	**Other Instrument**

Name.....
(PLEASE PRINT)
Street.....
City.....State.....
☐ Check here if under 16 years of age.

SAVE 2c—Stick coupon on penny postcard

WINDOW SIGN LETTERS
GENUINE GOLD LEAF

Guaranteed not to tarnish or fade. For store fronts & office windows. Anyone can put them on. These letters are made of tinfoil, and applied with a varnish cement.

SAMPLES FREE

METALLIC LETTER COMPANY, 428 N. Clark St., Chicago

THERE'S MONEY IN CARTOONS!

DON'T COPY—LEARN TO ORIGINATE!

RAYE BURNS will teach you HOW to CREATE ORIGINAL CARTOONS **at home** that you may SELL! Course contains **26 lessons** and **over 600 illustrations.** All for **only**..... **$2.85**

Send name and address for free details.

RAYE BURNS SCHOOL, Dept. S, Box 3583, Cleveland, Ohio

Here's How CREI Prepares You for a Professional Career with *Industry-Recognized* training in a minimum of time

RADIO-ELECTRONICS-TELEVISION ENGINEERING

GRADUATES of the Capitol Radio Engineering Institute residence school are preferred by industry because of their *training* and *ability*. This recognition is the reason that CREI men quickly find good jobs in radio-electronics-television engineering and technical fields.

With 22 years of practical teaching experience in these highly technical fields, CREI offers an outstanding faculty, modern and complete laboratories, shops and equipment.

New students are accepted twice monthly and each may advance as rapidly as he is capable. The basic course with one specialized course requires an average of 20 months to complete, depending on the ability of the individual student.

CREI is recognized as one of the country's leading technical institutes. Its work is of college level. It prepares the young man for a good job in industry in a minimum of time.

Approved for Veterans' Training

CAPITOL RADIO ENGINEERING INSTITUTE
An Accredited Technical Institute Founded in 1927
Dept. 185-A 16th and Park Rd., N. W., Washington 10, D. C.

MAIL COUPON FOR FREE CATALOG

Capitol Radio Engineering Institute, Dept. 185A
16th and Park Rd., N.W., Washington 10, D. C.

Please send me your illustrated catalog and complete details.

Name _____ Age _____

Street _____

City _____ Zone ____ State _____

☐ **I am entitled to training under G.I. Bill.**

Copyrighted material

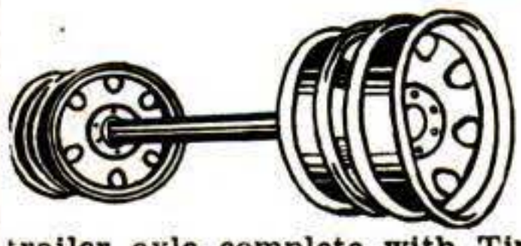
Thousands of Parts For Military

TRUCKS

We have for immediate delivery genuine parts for all makes and models. 4x2 - 4x4 - 6x4 and 6x6. All models from ¼ ton to 20 tons. All makes: Autocar, Biederman, Brockway, Chevrolet, Diamond T, Dodge, Federal, Ford, GMC, International, Mack, Oshkosh, Reo, Studebaker, White, Willys, and Jeeps. We have parts lists available on most models. Write stating model of Truck.

JEEP TOPS and CURTAINS

(Weatherizing Kit), complete top with back curtain and side curtains with zip-in-doors. 5 windows. Waterproof O.D. color. shipping weight 40 lbs. Wonderful value. F.O.B., K.C. **$39.50**



TRAILER AXLE

Heavy duty trailer axle suitable for many types of trailer construction. Also excellent for building of heavy farm trailers and wagons. It is a 12,000 lb. capacity square type straight trailer axle complete with Timken roller bearings, hubs, and 6 hole 750 x 20 Budd Wheels. Without brakes. Axle is 2 inches square and 69 inches between wheel mounting flanges. Std. width. AN EXCELLENT BUY.

With Single Wheels $59.50 With Dual Wheels $69.50

WINCH CABLE—New with hook, ⅝" in diameter, 300 ft. length..... **$37.50**

Steel Wire Rope **TRUCK TOW CABLE**—⅝" diameter, 15 ft. overall length. Loop on each end. Shipping weight 14 lbs. Price, each..... **$3.00**

TOW CABLE 15 ft. long, ¼" thick. Steel with clevis and eye. Every motorist should have for emergencies. Shipping weight 2½ lbs..... **$1.50**

UTILITY GAS TANK

6 Quarts—New Surplus. Cylindrical 5½" diameter. 15½" length. Brackets for mounting in horizontal position. Complete with Filler cap in center. drain plug in bottom and pet-cock on end. Ideal fuel tank for small gas engines, stoves, etc..... **$1.50**

All prices quoted good 30 days FOB, Kansas City. 25% deposit required on COD orders.

JEEP MOTORS

UNITED AUTO PARTS CO. INC

1901 TROOST · GR.1800 · KANSAS CITY, MO.

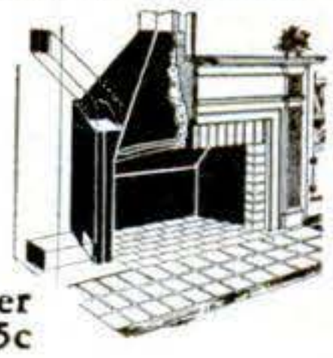
100 Fireplace Ideas FREE

For Home, Playroom, Cottage, or Camp

If You're Building Your Own Fireplace

HERE'S AN EASIER FOOL-PROOF WAY TO DO IT

Choose a design that will look well with the materials you have available. Prepare a concrete or brick slab the size of your fireplace. Center your FYRO-PLACE, the warm-air circulating form, on the base, and build round it. You will have a well-engineered, successful fireplace. You can't fail.



WRITE FOR BOOK TODAY

Small Book 4¼x5½ sent free. Larger Book, 8½x11, beautifully illustrated, 25c

Ask for Free Data on Outdoor Fireplaces

PRICE FIREPLACE HEATER & TANK CORP.

94 Austin Street, Buffalo 7, New York

Famous **BAILEY TECHNICAL SCHOOLS**

OFFER THE FOLLOWING COURSES:

PRACTICAL DIESEL ENGINEERING
REFRIGERATION - AIR CONDITIONING
COMMERCIAL ELECTRICITY
RADIO - TELEVISION MECHANICS

Your future success depends largely on the reputation of the school you attend. Don't take chances! Train at America's foremost school of mechanical specialization. Bailey is *recognized* and *approved* by industry. Bailey graduates get the top pay jobs! G.I. Approved. Send for FREE Catalog.

BAILEY TECHNICAL SCHOOLS

1656 So. Grand Blvd., St. Louis, Mo.

Command Bigger Money!

STUDY LAW

STUDY AT HOME for BUSINESS SUCCESS and LARGER PERSONAL EARNINGS. 40 years expert instruction—over 114,000 students enrolled. LL.B Degree awarded. All text material furnished. Easy payment plan. Send now for FREE BOOK—"Law and Executive Guidance." It explains the course—how you may enroll and the many ways you may profit from Law Study. Write TODAY to:

AMERICAN EXTENSION SCHOOL OF LAW

Dept. 14-PS, 646 N. Michigan Ave., Chicago 11, Ill.

ARTISTS MAKE MONEY

DO YOU LIKE TO DRAW?

Send name, address, age and occupation for FREE ART TEST, to find out your ability.

ART INSTRUCTION, INC.

5149 Art Instruction Bldg., Minneapolis 15, Minn.

Superette Dual Vacuum Auto Horns

The Voice of Authority on The Highway

One blast and those "road hogs" really move over Superette Horns compare favorably to air horns costing $75 to $100 Can be installed under hood or on front fender Beautiful lacquer finish. Operates from intake manifold of your car No tank needed Cost is only $8.95 complete with all necessary fittings, control valve and simple installation instructions. Send check or money order today or order C O D -- Adds much to your car.

THE PROTECTUROD COMPANY, Dept. 455
4033 Windsor Road, Youngstown 7, Ohio

Free Sample!

Big profits showing amazing GLOW-IN-THE-DARK SPECIALTIES. House numbers, pictures, plastic novelties, religious and nursery objects, etc. Large manufacturer. Enormous demand. Sell on sight. Write at once for FREE SAMPLES.

MADISON MILLS, Dept. T-5
303 Fourth Ave. NEW YORK 10, N. Y.

Copyrighted material

Newest CROSLEY STATION WAGON

Larger, longer body lines, new luxury interior appointments, speed styling, headlights in fenders, turn indicators, etc. All steel. Costs less than an 8-year-old, high upkeep used car. Real economy—up to 50 miles on a gallon. Prices range downward from the Station Wagon at only $929 F.O.B. Marion, Ind. For complete catalog of all 5 new models, write your name and address on the margin of this page, tear out, send to Crosley Motors, Inc., 2530-JE Spring Grove Ave., Cincinnati 14, Ohio.

CROSLEY
a FINE car

GENUINE GOATSKIN A-2 FLIGHT JACKETS

Brand New. Sizes 36-46
Were $21.95. Now $14.95

SUNGLASSES

$2.38 WITH CASE

Men's & Women's. Sweat Bar. 4 Base Ground & Polished Lenses.
Full line of Sports, Camp & Work Items
Send for FREE Catalogue. Orders sent postpaid. Sorry no C.O.D.'s. Satisfaction or money back.

CONSUMER'S CLOTHING CO. Inc., Box S, 26 Greene St., New York 13, N.Y.

RHEUMATISM

ARTHRITIS-NEURITIS-SCIATICA

If you suffer the agonizing pains of these diseases when the usual remedies have failed, learn about a new trustworthy, modern, non-surgical treatment method. This marvelous treatment is completely explained in the Ball Clinic's FREE Book. Write today. No obligation.

Ball Clinic, Dept. 36, Excelsior Springs, Mo.

SEND FOR THIS FREE!

Make money. Know how to break and train horses. *Write today for this book FREE*, together with special offer of a course in Animal Breeding. If you are interested in Gaiting and Riding the saddle horse, check here ( ) *Do it today—now.*

BEERY SCHOOL OF HORSEMANSHIP
Dept. 585 Pleasant Hill, Ohio

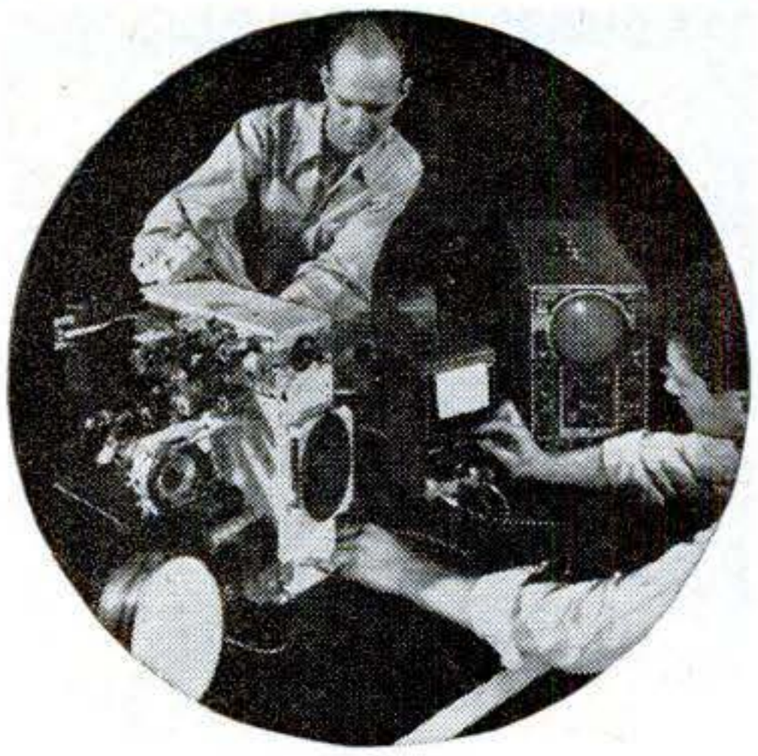
New DRILL PRESS ATTACHMENT

For Filing, Jig Sawing, Slotting, Cutting Keyways—101 Uses

Fits any drill press. Converts it to 101 uses from filing to sawing. Precision built attachment—can't wear out. Changes rotary drill press action to reciprocating action needed for sawing, etc. Simple to attach to your press. An $18.50 value. **New low price** $8.75, postpaid in U.S.A. with check or money order. C.O.D's acceptable. Order Today. We only have a few hundred left at this price. State make of drill press and taper. Money-back guarantee. Make ideal gifts for Father's Day, etc.

HYDRAULIC RESEARCH CO.
1500 W. Verdugo Ave., Burbank, Calif.

• SPECIALIZE •



You can become a radio and television technician now!

A million new jobs — almost 4,000 a week — will be created in the television industry during the next five years according to estimates of industry leaders. Actually, during 1948, television grew faster than any other industry in the history of America.

Here is a real opportunity for you. Trained television technicians are in demand. By starting now, you can get in on the ground floor — grow as television grows.

To help supply this needed manpower, the Milwaukee School of Engineering has expanded its radio and television courses. Now you can get complete practical, technical training in the MSOE laboratories. *This is not just a serviceman's course.* It prepares you for a career in all of the technical phases of television and radio.

This special course prepares you for any of the following careers:

- Television Serviceman
- Radio Serviceman
- Radio and Television Retailer
- Supervisor in Radio and Television Assembly
- Radio and Television Tester
- Broadcast Radio-Operator
- Police, Taxi-Cab and Railroad Transmitter Operator
- Police, Taxi-Cab and Railroad Receiver Serviceman

OTHER COURSES AVAILABLE

SERVICE	TECHNICIAN	PROFESSIONAL
6 to 12 Months	1 to 2 Years	3 Years
• Electricity	• Electrotechnics (Power)	• Electrical Engineering Bachelor of Science Degree Major in Electronics or Power
• Welding	• Radio and Television	
• Refrigeration	• Electronics	
• Heating	• Refrig., Heating and Air Cond.	

MILWAUKEE SCHOOL of ENGINEERING

A Technical Institute Founded 1903 by Oscar Werwath

MILWAUKEE SCHOOL OF ENGINEERING,
Dept. PS-549 N. Broadway and E. State, Milwaukee, Wis.

Without obligation send me free booklet "Career Building" and more details on course in Radio and Television or .....course.

Name.....Age.....

Address.....

City.....Zone .....State.....

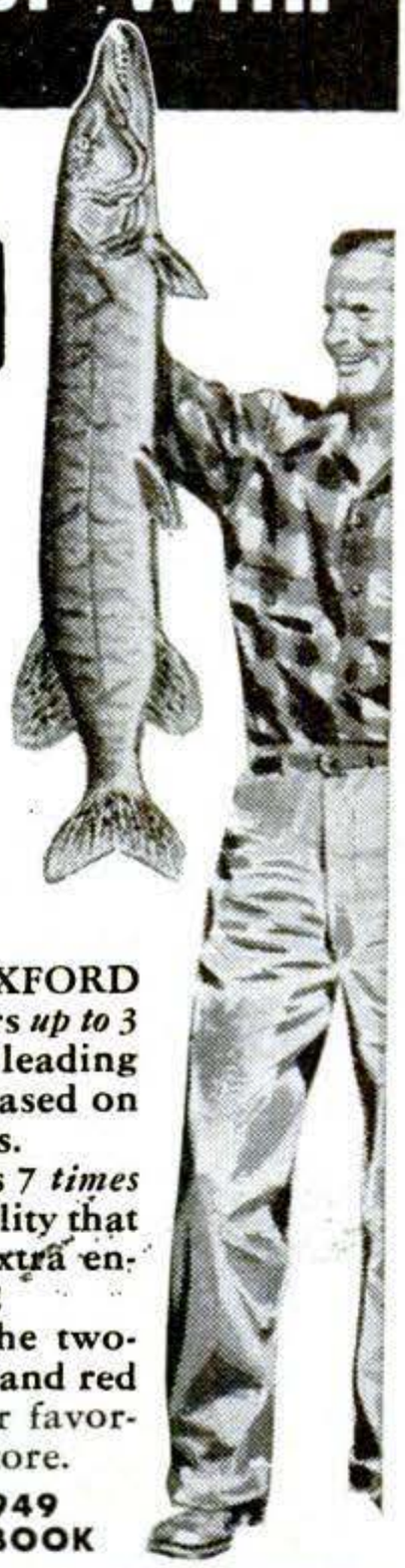
• BUILD YOUR CAREER WITH PRACTICAL TECHNICAL TRAINING •

Copyrighted material

Get More Fishing THRILLS Cast Better With

Shakespeare

WEXFORD



A WONDER LINE

•

WEARS UP TO 3 TIMES LONGER

•

AVERAGES 7 TIMES MORE WATER-RESISTANT

When you hook 'em, WEXFORD holds 'em . . . because it wears *up to 3 times longer* than any of 10 leading lines tested. This is a fact, based on independent laboratory tests.

And WEXFORD averages 7 *times more water-resistant* . . . a quality that gives you smoother casts, extra enjoyment every time you fish!

Ask for WEXFORD in the two-spool blue and red box, at your favorite sports store.

FREE 1949 TACKLE BOOK

and Pocket Fishing Calendar. Newest in tackle, fishing tips. Write Shakespeare Co., Dept. PS-5 Kalamazoo 2, Michigan.

Shakespeare

FINE FISHING TACKLE

HONOR BUILT FOR OVER 50 YEARS

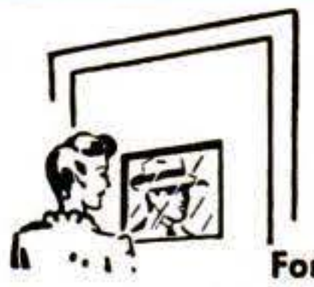
BE A SUPERVISOR

Franklin Technical Institute Helps Young People Get Ahead

• Specialized technical training opens wide the door to well-paid supervisory jobs in industry. 50.000 young men and women have graduated from this Boston school and found good jobs in engineering and technical fields.

Practical two-year day courses in industrial electricity and electronics. industrial chemistry. mechanical and machine design. structural design and architectural drafting. automotive service and management. electric wiring and maintenance. One-year course in professional photography. Also preparatory and evening classes. Approved for veterans. 41st year. Write for catalog.

FRANKLIN TECHNICAL INSTITUTE
39 Berkeley Street **Boston 16, Mass.**



MAGIC MIRRORS

See thru one side
Reflects image on other

For FRONT DOORS, OFFICES, and hundreds of other applications

The amazing mirror which permits you to see thru one side while person on other side sees image of himself. Housewives to see visitors . . . businessmen to see customers... professional men to see clients...waiters to watch tables... police to observe criminals. This type mirror originally developed for Radar Equipment.

PRICES	3" x 4"	$1.50
POSTAGE PAID	4" x 5"	2.10
IN U. S. A.	5" x 7"	4.20
	6" x 8"	6.30
	8" x 10"	7.00

Larger sizes available

Guaranteed —— send orders direct to

PACIFIC UNIVERSAL PRODUCTS CORP.
168 North Vista Avenue • Pasadena 8, Calif.

FIREWORKS ZOW-E-E-E!!

BIG GIANT ASSORTMENT
$10.65 VALUE—ONLY $4.95

Hundreds of pieces of fireworks in this big bargain assortment for only $4.95. Plenty for a bang-up noisy daytime celebration and plenty for a colorful night display. You'll get the thrill of your life down to the last piece. Giant Cannon Salutes, Sky Screamers, Buzz Bombs, Star Shells, Block Busters, Zig Zag Whistles, Flashlight Krackers, Sky Rockets, Roman Candles, Repeating Aerial Bombs and many others. Be sure of getting yours. Rush order today. Send Certified Check, Money Order, Bank Draft. Register letter if you send cash. No C.O.D's. Catalog FREE.

BUCKEYE FIREWORKS CO. DEPT. 114
Wapakoneta, Ohio

LUMBER

A BOARD OR A CARLOAD

Unequaled Bargains

TOP GRADE KILN DRIED
Walnut
Mahog.
Cherry
Maple
Wh. Hard and Soft
Poplar
Pl-Qtr.
Oak
Aromatic Red Cedar

BIG NEW 144 PAGE CATALOG No. 16 of hard to find woodwork items, hardware and supplies; the finest craftsman catalog Harold Hunt ever published—32 rare and fancy woods in natural colors—also in color, 43 matched veneer designs, multi-colored bandings, inlays, overlays, shows over 275 scroll patterns to choose from. Only 15c rebated on first order.

CRAFTSMAN WOOD SERVICE CO.
2729 S. Mary St. **Dept. B-4** **Chicago 8, Ill.**

Learn MECHANICAL DENTISTRY

A profession offering unlimited opportunities. Most modern and complete course embracing every branch from Plate to Porcelain Work, which prepares you to work for Dentists or start your own business. Individual instruction—practical training in day or night school. No books—no classes. Catalog upon request.

McCARRIE SCHOOL of Mechanical Dentistry
207 N. Broad St. **Dept. 886** **Philadelphia, Pa.**

A REAL MIDGET RADIO!

CARRY IT IN YOUR POCKET

Works on new diode—**NEEDS NO TUBES, BATTERIES OR ELECTRIC "PLUG-INS".** Plays years for nothing! IN BEAUTIFUL RED PLASTIC CASE.

GUARANTEED TO WORK on local stations

SEND ONLY $1.00 (bill, ck, mo) and pay postman $2.99 C.O.D. plus postage or send $3.99 and we pay postage. **SENT COMPLETE. READY TO PLAY** on simple attachment. JUST THE MIDGET TO LISTEN AT HOME, IN BED, IN HOTELS, SCHOOL, MOST ANYWHERE ANYTIME. Wonderful gifts for anyone! Amazingly low-priced! Order Now!

MIDWAY CO. Dept. TPS-5 KEARNEY, NEBR.

Copyrighted material

"You're Sure to Have MORE FUN with a Coleman Along" — Says Andy Devine

"I like plenty of good food wherever I go, and I get it quick with my Coleman Folding Camp Stove without any waiting, fuss, muss or bother. I just set it up and start cooking, and in no time I have the kind of food that satisfies a big outdoor appetite."

Andy Devine can currently be seen in the Republic Picture, "The Last Bandit."

Coleman Folding CAMP STOVE

Lights instantly. Cooks like a city gas range. Makes and burns its own gas from gasoline. Folds up, carries like a suitcase. Ask your dealer for a demonstration.

Prices as low as $9.95 in U. S. A.

Coleman Floodlight LANTERN

Adds more hours of fun to each day. Floodlights 100-ft. area. Storm-proof. Safe. Durable. Prices as low as $9.95 in U.S.A. Ask your dealer for demonstration.

Used and Endorsed by LEADING OUTDOORSMEN Everywhere!

The Coleman Company, Inc.
Wichita 1, Kansas

The Coleman Company, Inc.
Dept. 216-PS, Wichita 1, Kansas

Please send me FREE booklet on the Coleman Folding Camp Stove and other Coleman Appliances.

Name_____

Address_____

City_____ State_____

SALESMEN!

10-Second Demonstration Nets You $9.95

Yes — Storekeepers now "Write with Light" — wipe off and write new sign — all in 10 seconds. Fastest seller in years. 10-second demonstration pays you $9.95 cash in advance. Orders pour in HAND-OVER-FIST. Get started in your terrritory while "LITEWRITER" is brand new and hot as a pistol.

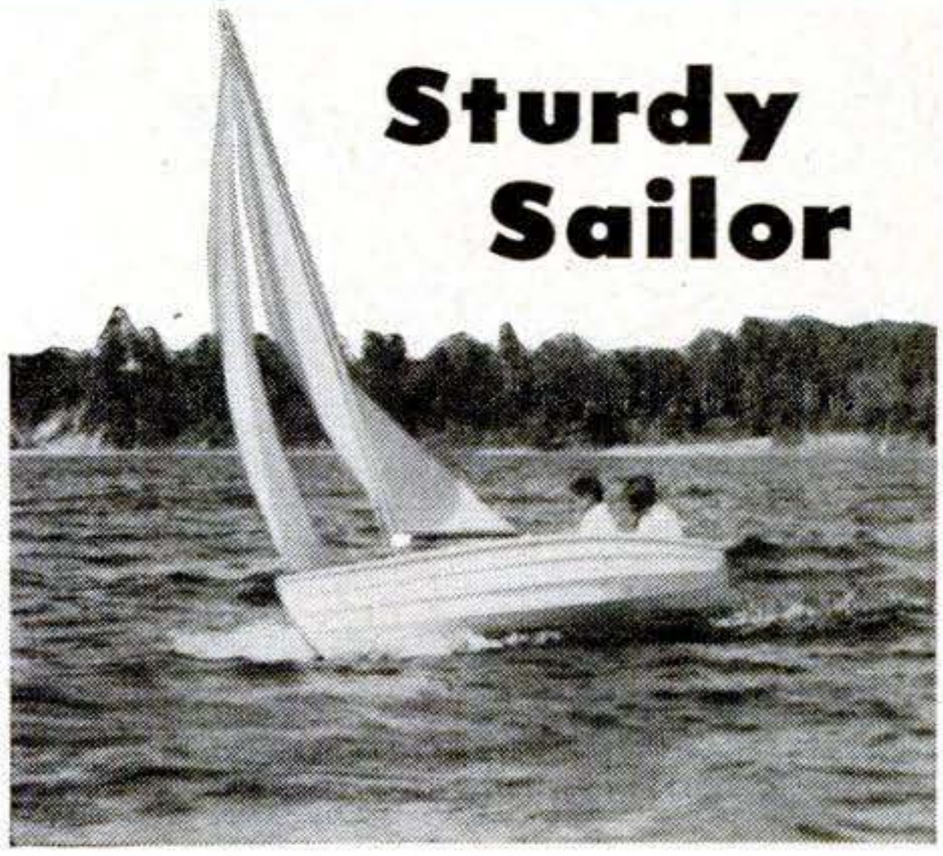
Litewriter "MAGIC CRAYON" MAKES SIGNS THAT GLOW LIKE BRILLIANT *NEON!*

Merchants everywhere — in small town and big city — all stare with amazement at this newest of all Fluorescent Sensations! They write on glass with "MAGIC CRAYON" — and Presto! — before their very eyes — there's a 5-color Advertising Message that glows like a brilliant Neon Sign!

FREE! Complete Sales Kit. Send name on penny postcard NOW for Big FREE Sales Kit and Free offer of Sample Demonstrator. No cost now or ever. Rush postcard **now.**

MAXILUME CO., 125 W. Hubbard St.
DEPT. L-95 • CHICAGO 10, ILLINOIS

Sturdy Sailor



MEET the challenge of strong winds in Old Town's swift-sailing lapstrake sailboat. She's 13½ feet long, carries 90 feet of sail. Very easy to handle. Built by Down-Easters who know sailboats. Solid deck. Full-length decking. Upkeep is easy.

FREE CATALOG gives the facts on the sturdy lapstrake sailboat. Also shows canoes, outboard boats, dinghies, rowboats. Write today. Address Old Town Canoe Company, 545 Wood Street, Old Town, Maine.

"Old Town Boats"

Copyrighted material

TRAVEL for ★"UNCLE SAM"

START as high as $3,351 Year

Prepare NOW For Next Examinations

20,000 appointments each month

VETERANS GET SPECIAL PREFERENCE
Many examinations expected soon
City Mail Carriers
City Postoffice Clerks
Stenographers-Typists
Messengers,
Liquor Inspectors—
and many others.
40-Page Book on Civil Service FREE

Mail Coupon today— SURE ★

COUPON

FRANKLIN INSTITUTE
(Not Government Controlled)
Dept. P80
Rochester 4, N. Y.

Rush to me, entirely free of charge, 40-page book with: (1) A full description of U. S. Government jobs; (2) A list of U. S. Government jobs; (3) Tell me how to qualify for a job.

Name.....

Address.....

.....Vet?.....

She's some *SMOOTHIE!*

(YOUR **CAR,** THAT IS)

when equipped with

ADVANCE DEEP TONE MUFFLERS
(SINGLE STRAIGHT-THRU OR DUAL SET)
Rich, low, mellow tone. Also greater power, speed, and economy result from reduced back pressure. Rugged steel tube, blow-out proof. Simple to install. No welding. Dual set comes complete with rubber mounted clamps, fittings.

ADVANCE FENDER SKIRTS
Heavy duty steel skirts to beautify, streamline. Tight fit, no rattle, easy to install, prime painted.

KI-YI AND RAZZ HORNS
Get these novelty horns for laughs.

MAIL COUPON BELOW

ADVANCE MUFFLERS Dept. PS-59
6800 S. VERMONT AVE., LOS ANGELES 44, CALIF.

Send check, money order, or we will mail C.O.D. You pay postage upon receipt.

- ☐ Dual Muffler Set (Ford, Mercury only) .. $20.00
- ☐ Single Muffler (Ford, Chev., Plym.) .. 4.86
- ☐ Single Muffler (other makes) $5.50
- ☐ 2½" Chrome tail pipe tips 1.75
- ☐ Fender skirts, pr. $16.95
- ☐ Ki-Yi Horn, each 3.25
- ☐ Razz Horn, each 3.25
- ☐ Send free catalog showing complete line.

Car make_____Year_____Model_____

Name_____

Address_____City_____State_____

SIRENS AS GLAMOROUS AS ESQUIRE PIN-UPS

NOW YOURS IN SMART **HOME MOVIES**

Order from these latest releases:-
G-7 BEAUTY BATTLE—G-11 ALLURE
G-20 MODEL MAIDS—G-5 SEVEN SIRENS.
Your choice, 50 ft. 8mm. $2.00—100 ft. 16mm., $4. Enclose payment, we mail postpaid. Or for sample film strip and illustrated catalog of all films available, send us 25c with your name and address.

GAMERMANS, Dept.S-15
3808 EASTERN AVENUE
BALTIMORE 24, MD.

LEARN MEAT CUTTING At Home—In Spare Time

Get into the vital meat industry. Concise, practical Home Training based on 25 years proven instruction methods used at National's famous resident school. Prepares you for bigger pay as Meat Cutter, supervision, market manager or more money in your own store. Go as rapidly as your spare time permits. Diploma. Start NOW to turn your spare hours into money. Send for FREE bulletin today. No obligation.

National School of Meat Cutting Inc., Div. O-78, Toledo 4, Ohio

---

Easy, Easy Money!

Nothing to buy. We supply FREE SAMPLE, solid brass front door name plate; beautifully engraved; bright lasting finish. Sells on sight. Every home buys. Show sample. Take order. Collect $1 deposit. Keep it. Mail order to us. We deliver and collect $1.98 balance. Make $25, $50 and more every week, spare time. Write NOW for FREE sample and simple selling help hints.

Dept. 264, NATIONAL ENGRAVERS
214 Summer Street, Boston, Mass.

SHORTHAND in 6 Weeks at Home

Famous Speedwriting system. No signs; no symbols; no machines; uses ABC's. Easy to learn; easy to write and transcribe. Fast preparation for a job. Surprisingly low cost. 100,000 taught by mail. Used in leading offices and Civil Service. Write for free booklet to:
Speedwriting, Dept. 2605-9, 55 W. 42 St., N. Y. 18, N. Y.

Learn Profitable Profession in 90 days at Home

MEN AND WOMEN, 18 TO 50—Many Swedish Massage graduates make big money. Large full time incomes from doctors, hospitals, sanatoriums, clubs or private practice. Others make good money in spare time. Prepare for future security by training at home and qualifying for Diploma. Anatomy Charts and 32-page Illustrated Book FREE—Now! **The College of Swedish Massage, Dept. 970-E, 41 E. Pearson, Chicago 11.**

HOW TO CUT RAFTERS

New vest pocket book gives lengths, side cuts, plumb cuts, deductions. For all rafters for any building from one inch to forty feet wide. Gives numbers to cut on square. Also degrees for same cuts for Radial Saws. All standard pitches from 1/8 to 5/8. Just open book to pitch page and there are your lengths, side cuts, etc. Anyone who knows what a jack rafter is can frame a roof if he has this great book. Price $1.50 prepaid. **Builders' Topics, Dept. S, Lock Box 828, Seattle, Washington.** CARPENTERS, PLUMBERS, PLASTERERS, ELECTRICIANS, ETC., subscribe for Builders' Topics, the monthly magazine for HEMAN CONSTRUCTION WORKERS. Only $2.00 per year. Sample copies 25c.

Copyrighted material

FROM TROLLING SPEED TO FULL THROTTLE IN AS LITTLE AS 3 SECONDS*

NEW *Martin* MOTORS acclaimed: "Best Outboards Ever Built!"

NOW, MORE THAN EVER BEFORE, *THE NEW STANDARD OF PERFORMANCE*

Expect much . . . and get more . . . from amazing MARTIN OUTBOARD MOTORS! Thrill to unexcelled outboard motor performance . . . speed . . . beauty . . . flexibility . . . endurance! Once you MAN-A-MARTIN . . . you'll enjoy outboard motoring at its best. Only MARTIN has mechanically controlled intake poppet valves for perfect fuel control at all speeds . . . full 360 degree power head swivel . . . simplified, synchronized throttle and spark controls . . . streamlined, leak-proof filler cap . . . vertical stern adjustment . . . more horsepower per pound of motor weight . . . plus many other outstanding features. Every MARTIN MOTOR is "Performance Tested" by experts before it leaves the factory, your assurance of highest quality and workmanship. See the entire MARTIN line—3 sizes —at your dealers today!

Write for FREE illustrated booklet on Martin Motors, plus "Tips For Tops In Outboard Motoring". Address: Martin Motors, Dept. PS-4917, Eau Claire, Wisconsin.

MARTIN MOTORS are priced from $119.95

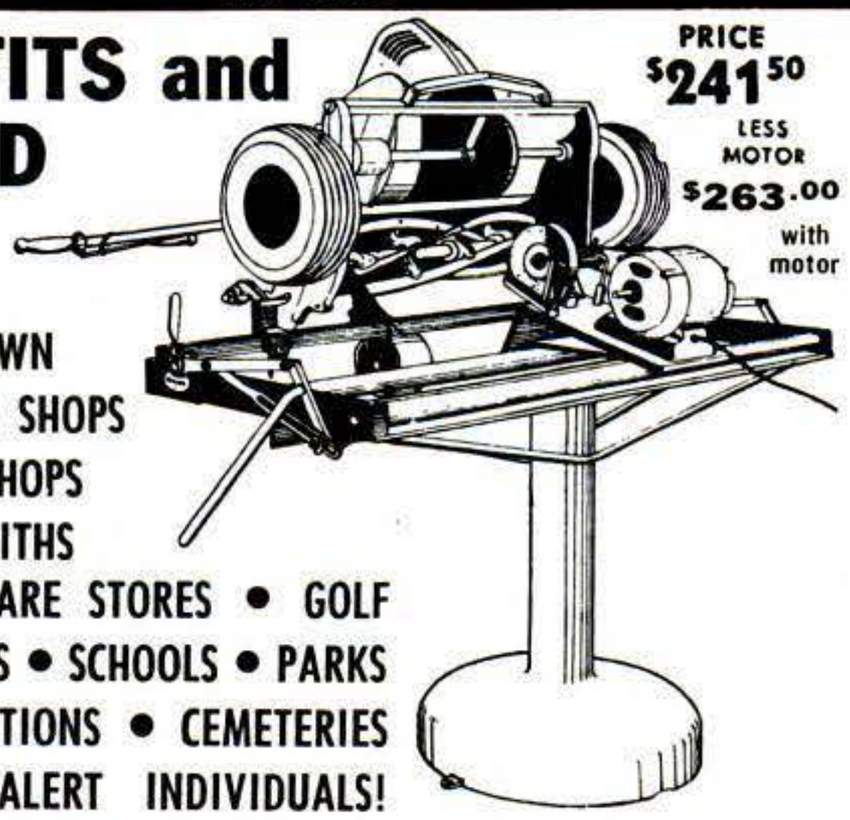
Martin OUTBOARD MOTORS

***MARTIN "60"**
Alternate Firing Twin
7.2 H.P.
Approx. 44 lbs.
Certified at 4,000 R.P.M.

MARTIN MOTORS, DIVISION, NATIONAL PRESSURE COOKER COMPANY, Eau Claire, Wis.
Canadian Sales by: Martin Motors, Division, National Pressure Cooker Co. (Canada) Ltd., Wallaceburg, Ont.

MODERN LAWN MOWER SHARPENER

PROFITS and SPEED



PRICE $241.50 LESS MOTOR
$263.00 with motor

- FOR LAWN MOWER SHOPS
- FIXIT SHOPS
- LOCKSMITHS
- HARDWARE STORES • GOLF COURSES • SCHOOLS • PARKS
- INSTITUTIONS • CEMETERIES
- AND ALERT INDIVIDUALS!

Sharpens All Reel Type Mowers • Hand, Power or Gang • 10 to 20 Minutes • No Dismantling No Extra Attachments Needed

All reel type mowers, from 5-inch edgers to 36-inch power mowers, are quickly sharpened to extreme ends of both left and right twist reel blades. Handle, wheels, roller and motor remain in place when sharpening is in process. Bed knife is sharpened in same brackets that hold mower in grinding position. No extra attachments required. One lever puts mower or bed knife in grinding position. 100% steel construction. Grinding head rides on five ball bearing races. Easy to operate. Sharpens wood chisels, joiner knives and planer blades without extra attachments.

ORDER NOW Immediate Delivery

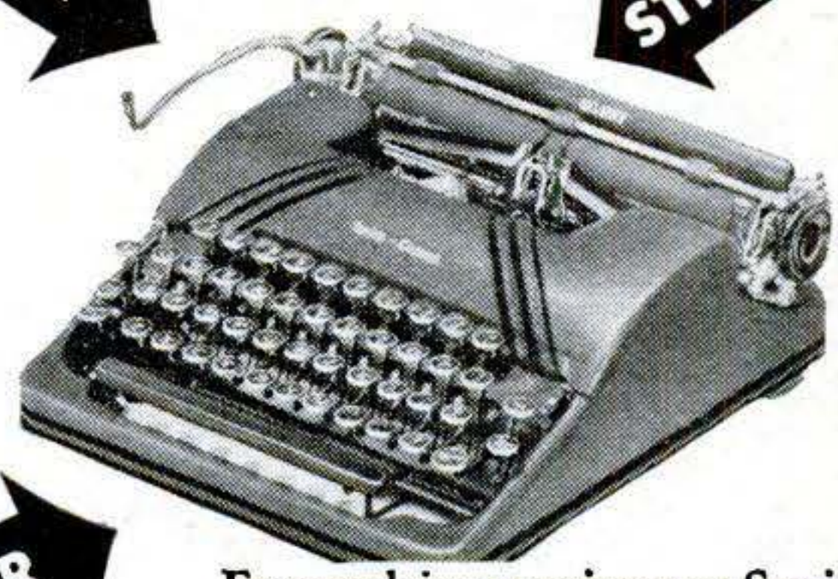
Skate Sharpener Attachment Available

Send for FREE ILLUSTRATED BULLETIN No. 11C

MODERN MFG. CO. 160 N. FAIR OAKS AVE PASADENA 1, CALIFORNIA

FASTER

STRONGER



FINER

LOW COST

EASY TYPING

Everything points to Smith-Corona as your choice in a portable. Trade in your old machine. Get a new Smith-Corona on easy terms.

Ask about these features

1. TOUCH SELECTOR
2. VARIABLE LINE SPACER
3. FLOATING SHIFT
4. ONE STROKE RIBBON REVERSE
5. TYPEBAR SPEED BOOSTER

Smith-Corona

PORTABLE TYPEWRITER

Copyrighted material

CASCO

New TOOL'N'RAK

HANGS UP WHERE YOU WORK

for
wood
metal
leather
glass
plastics
fibre

It drills!
It saws!
It carves!
It sands!
It sharpens!
It polishes!
It etches!
It grinds!
It cuts!

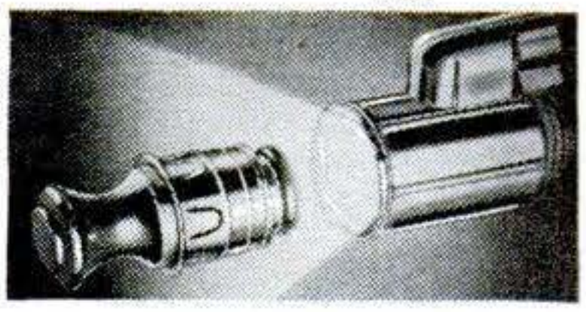
ALL 40 PCS.
17.95
COMPLETE

Complete with every motor-driven tool you need to build models, fashion jewelry, etch glass, tool leather, carve plastics, rout metal... to fix, make, repair, and create... *plus* 1001 time and money-saving uses around your home! Beautifully-finished solid hardwood rack keeps everything at your fingertips—yet hanging up out of your way! Vibrationless 27,000 RPM fractional HP motor, AC-DC. Radio Static suppressor. 36-page Project Book FREE! Now at Department, Hardware, Auto Supply, Appliance, and Jewelry stores **17.95**

VIS-O-LITE

Casco's amazing new car lighter!

Eliminates fumbling in the dark!
Helps keep your eyes on the road!



Press it in—VIS-O-LITE pops out *automatically* when ready! While you're lighting your cigarette, the lighter well glows softly on your dashboard. Guides your hand surely back. Easy to install... **$2.75** complete.

Note: You can bring your present Casco lighter up to date with the illuminated well alone... for only **$1.50**

RENEW YOUR OLD CAR LIGHTER only $1

Heating element worn out? Just screw-on another Casco unit.. **$1.00**

(9 out of 10 car lighters are Casco-made. Insist on genuine Casco Replacement parts!)

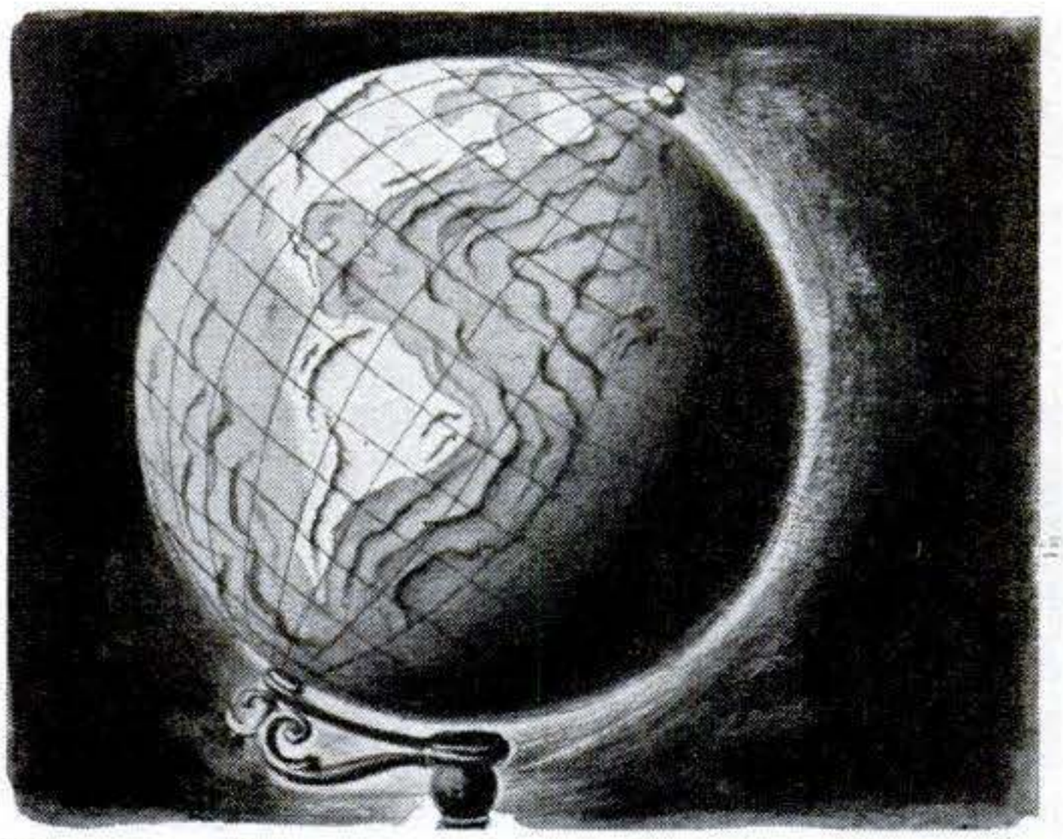
Lighter unit lost? Replace it with a complete new Casco Pop-out unit... **$1.50**

Now featured at Car Dealers, Auto Supply Stores, Garages, and Gasoline Service Stations!

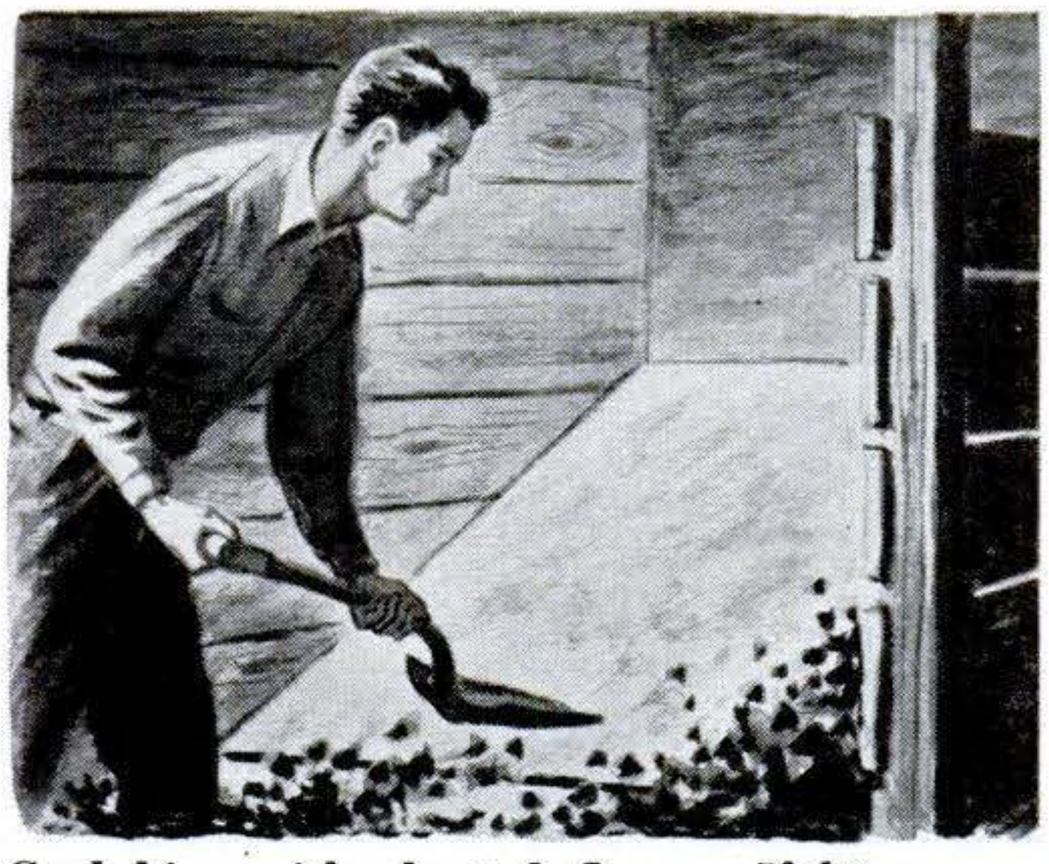
CASCO CASCO PRODUCTS CORPORATION BRIDGEPORT 2, CONN.

I'd like to see them make...

Everybody has his own pet idea of some gadget he would like to see in general use. What is YOURS? *Popular Science* will pay $5.00 for each one published. Use government postcards only. Contributions cannot be acknowledged or returned.



Globes with mountains and oceans shown in relief. The scale would have to be exaggerated. Maybe the globes could be molded of plastic, with land and sea in different colors.—*James Froberg, Palma Sola, Fla.*

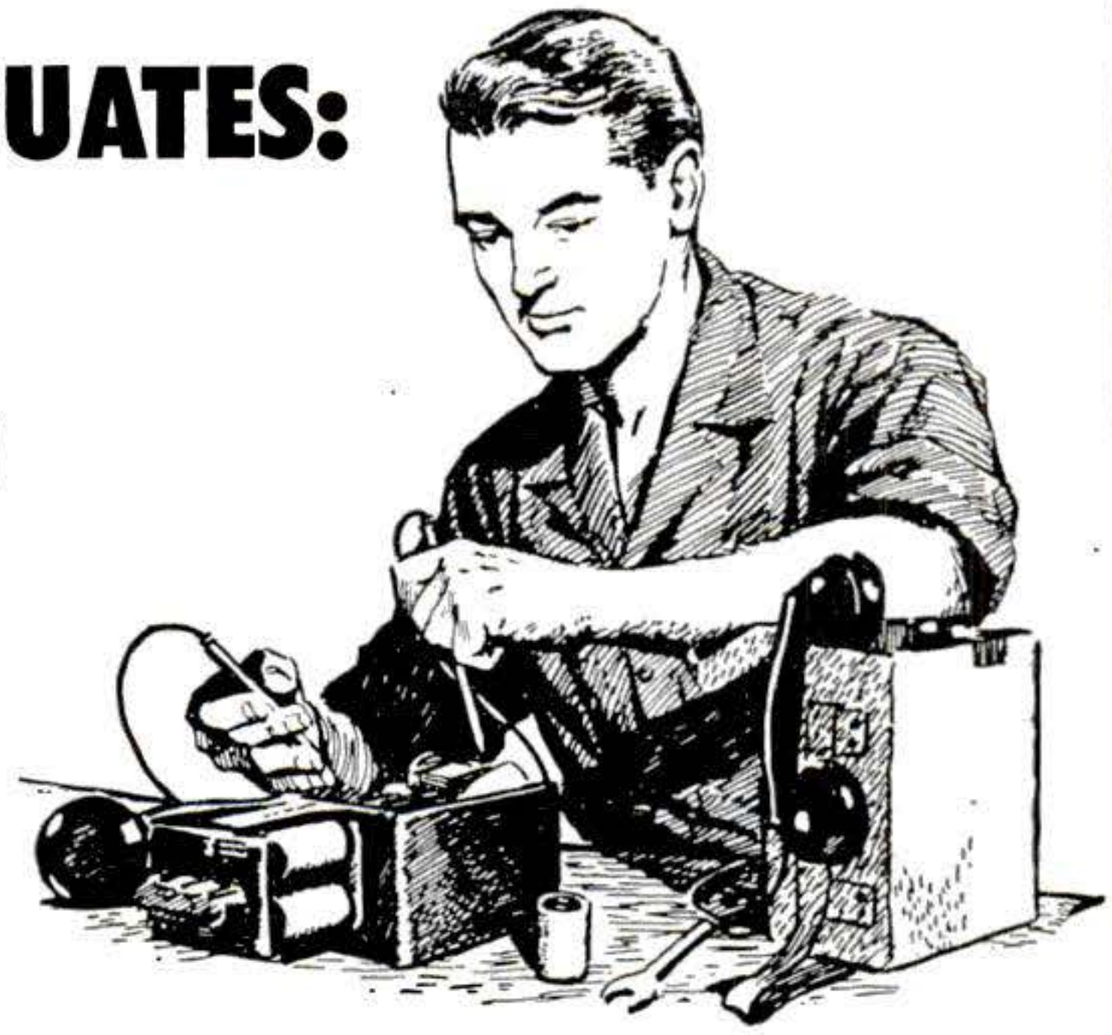


Coal bins with slanted floors. If bins were built with about three-quarters of the floor higher at the rear than at the front, even the last half ton would be easy to reach.—*James A. Brady, Jr., North Attica, O.*

Copyrighted material

HIGH SCHOOL GRADUATES:

Get Paid While Finishing Your Education



Prepare for a Career with Uncle Sam!

When you finish high school in January or June, plan to complete your education in one of the U. S. Army specialty schools. You'll get good pay while learning, plus free board and room, free clothing and equipment, medical and dental care. And you'll share in the U. S. Army's great retirement plan. After you have finished high school, select the army course you want. Get the facts . . . without obligation . . . at your nearest U. S. Army Recruiting Station.

Take Your Choice of the World's Finest Specialist Schools

These are just a few of the courses offered in more than 60 Specialty Schools of the U. S. Army. In these schools you use the latest equipment . . . learn from the finest instructors.

Liaison Airplane and Engine Mechanic.
Construction Equipment Maintenance and Repair.
Refrigeration Equipment Installation and Repair.
Carburetion and Fuel Induction.
Laundry Machine Operation, Maintenance and Repair.
Office Machine Repair.
Power Generators.
Teletype Repair.
Engineer Drafting.
Army Administration.
Medical Technician.
Automotive Maintenance and Minor Repairs.
Locomotive Repair.
Marine Engine Lubrication and Maintenance.
Marine Engineer Repair.
Power Shovel Operation.
Air Compressor Operation.
Dozer Operation.
Water Supply and Purification.
Railway Bridge Construction and Repair.
Pipe System Installation and Repair.
Ship Fitting.
Electric and Acetylene Welding.
Sheet Metal Work.
Time Rebuilding.
Tailoring.
Leather and Canvas Work.
Cable Splicer.
General Electricity.
Telephone and Telegraph Installation and Repair.
Stenography.
Radio Operation.
Precision Tool Repair.
The Coaching of Physical Training and Athletics.

Copyrighted material

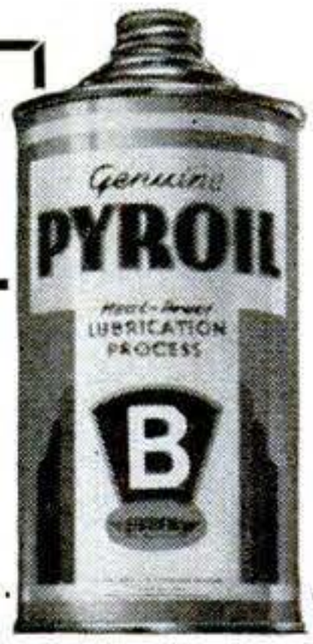
Springtime is PYROIL Time TOO...

Springtime means the open road . . . added driving, added mileage . . . and added wear and tear on your car. That's why the wise driver knows that Springtime is Pyroil time, too, because Pyroil wraps a fine film of protective oil around piston and cylinder surfaces, reducing friction wear; carbon, sludge and gum formation. In the weeks ahead, to make sure those added miles of driving will be carefree and trouble-free, remember to add Pyroil . . . and add miles to your car.

Pyroil for Aircraft Engines

Use Aircraft Pyroil B for lubricating oil, Aircraft Pyroil A for gasoline.

GIVEN!
An attractive Pyroil metal savings bank — takes coins up to 50c pieces—is yours for the asking —sent postage paid.



Manufactured and Guaranteed by
PYROIL COMPANY,
398 Main Street,
La Crosse, Wisconsin.
Canadian Distributors:
Central Purchasing Agencies, Ltd.,
Toronto, Ontario

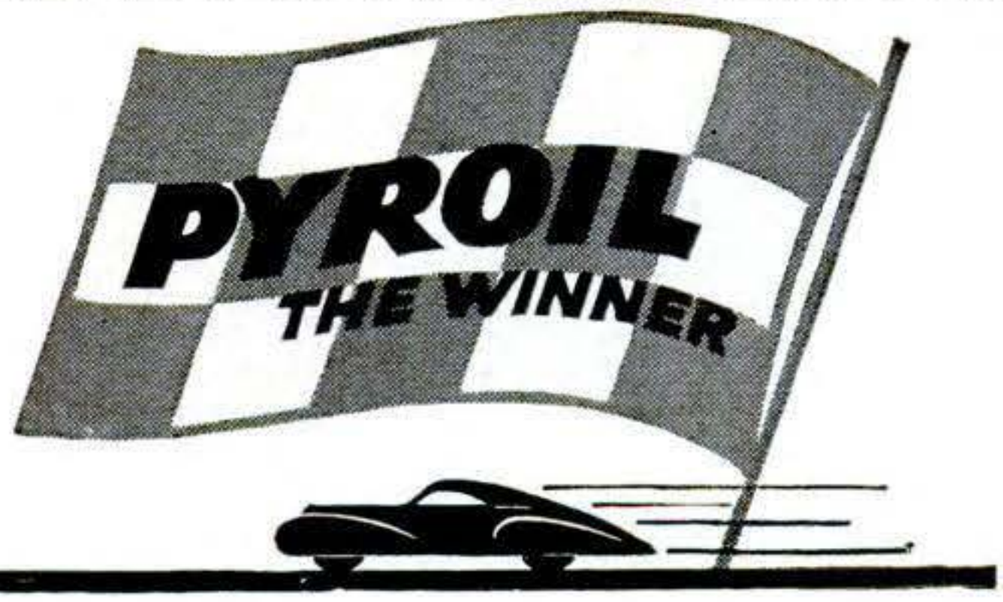
PYROIL COMPANY
398 Main Street, La Crosse, Wisconsin

I want my car to last and run properly. Please tell me more about Pyroil and how it can accomplish this for me.

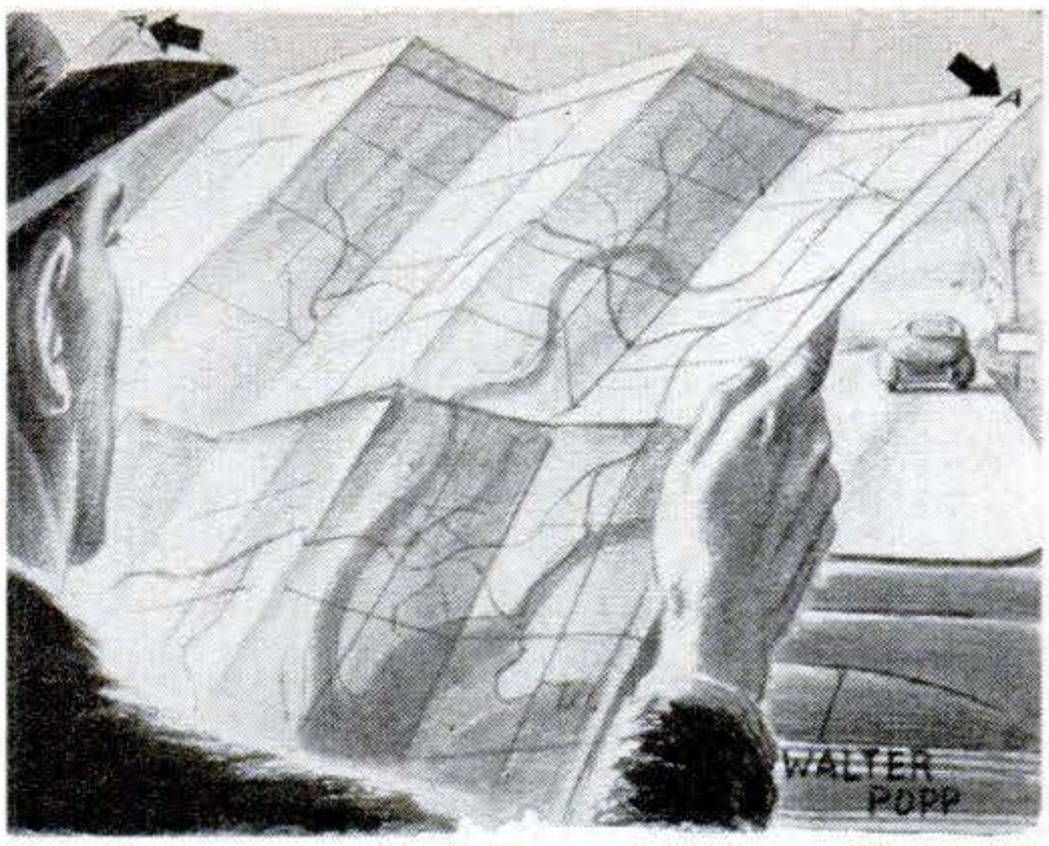
Name.....

Address.....

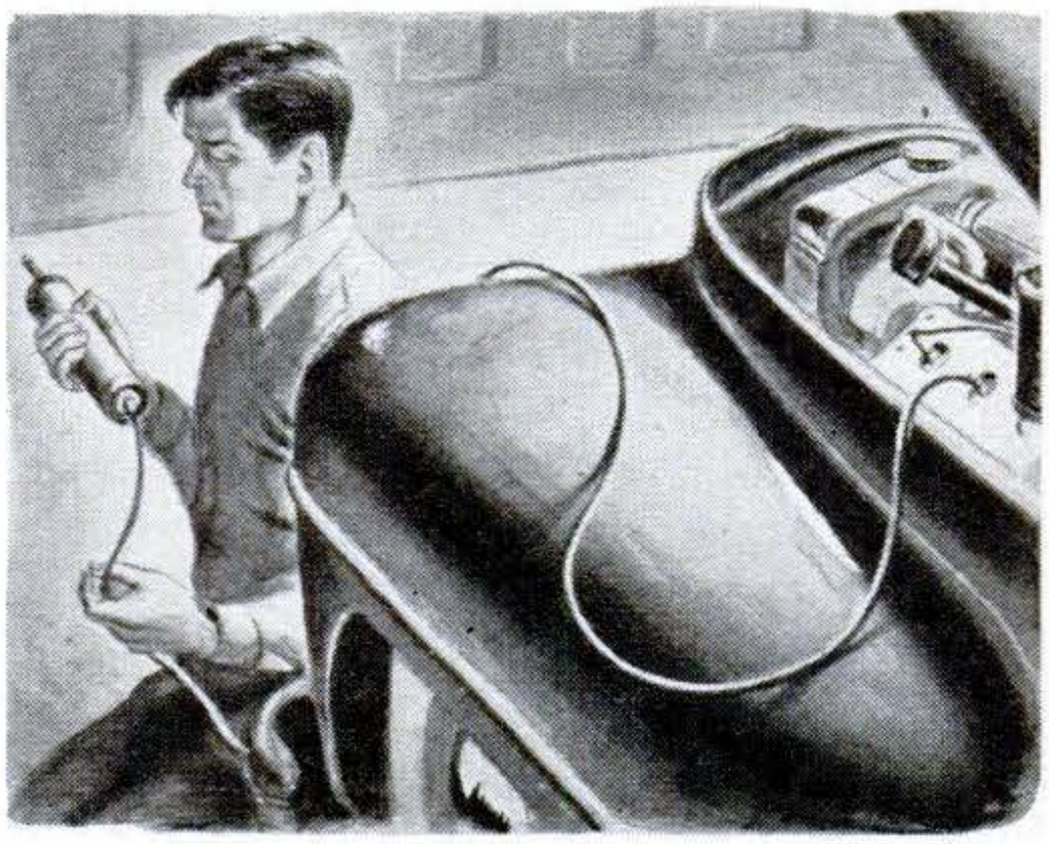
City or Town.....*State*.....



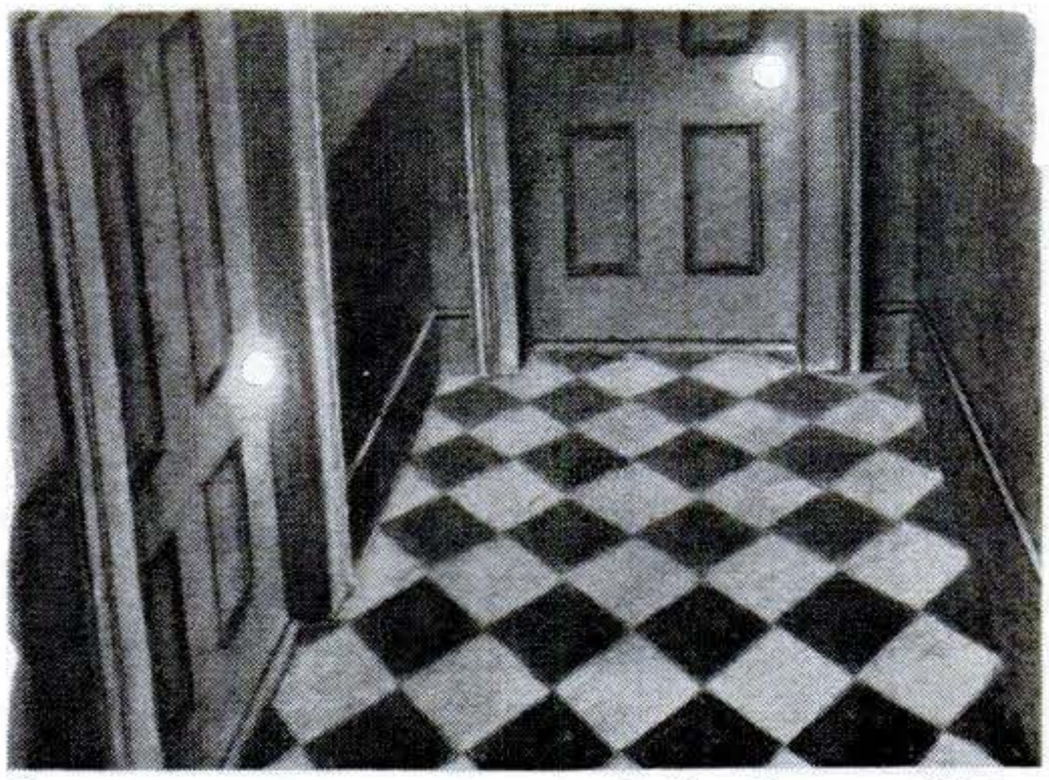
I'd like to see them make . . .



Road maps marked for refolding. If they'd letter or number the creases of road maps, you could properly refold the map just by folding the same numbers or letters face to face.—*Ed Redmond, Corpus Christi, Tex.*



Compression-powered grease guns. By removing a spark plug, you could use engine compression as the muscle for home grease jobs. The gun would need some kind of by-pass valve.—*W. H. Burchett, Tracy, Calif.*



Luminous doorknobs. Such knobs would be an advantage on almost every door. Normally they would receive enough light from daylight or artificial lights to keep them glowing at night. —*Gene Klappench, Wausau, Wis.*

Copyrighted material

Marlin ANNOUNCES

SENSATIONAL NEW SEMI-AUTOMATIC

New IN DESIGN

New IN PERFORMANCE

Marlin's 88C sets new standards of rapid-fire reliability in the .22 semi-automatic field!

Can you pull a trigger five times a second? This Marlin is faster! What about fouling? Marlin's new bolt and receiver design is virtually foul-proof! There is *no* opening back of ejection port to permit dirt-fouling.

Take-down is simple and fast. Action *cannot* be disassembled if rifle is cocked. Positive sear-locking Safety prevents accidental firing. Breech bolt specially designed to reduce smoke escape and blast to minimum.

Model 88C is a 14-shot tubular magazine semi-automatic rifle. Shoots .22 cal. long rifle ammunition, greased or waxed, regular and high velocity, with lightning speed and remarkable dependability.

American Black Walnut stock. Equipped with hooded ramp front sight and Rocky Mountain rear sight. Barrel length 24"; overall length 45"; weight approx. 6¾ lbs.

Price slightly higher west of Rockies and in Canada

12 blades for 25¢
Single or Double Edge
Guaranteed by Marlin—
Fine Guns Since 1870

Marlin Guns and Marlin Blades also available in Canada.

THE MARLIN FIREARMS CO.
NEW HAVEN, CONN. Fine Guns Since 1870

BOYS! Be a Ranger! Write Sportsmen's Service Bureau, 343 Lexington Ave., New York, for FREE booklet on marksmanship.

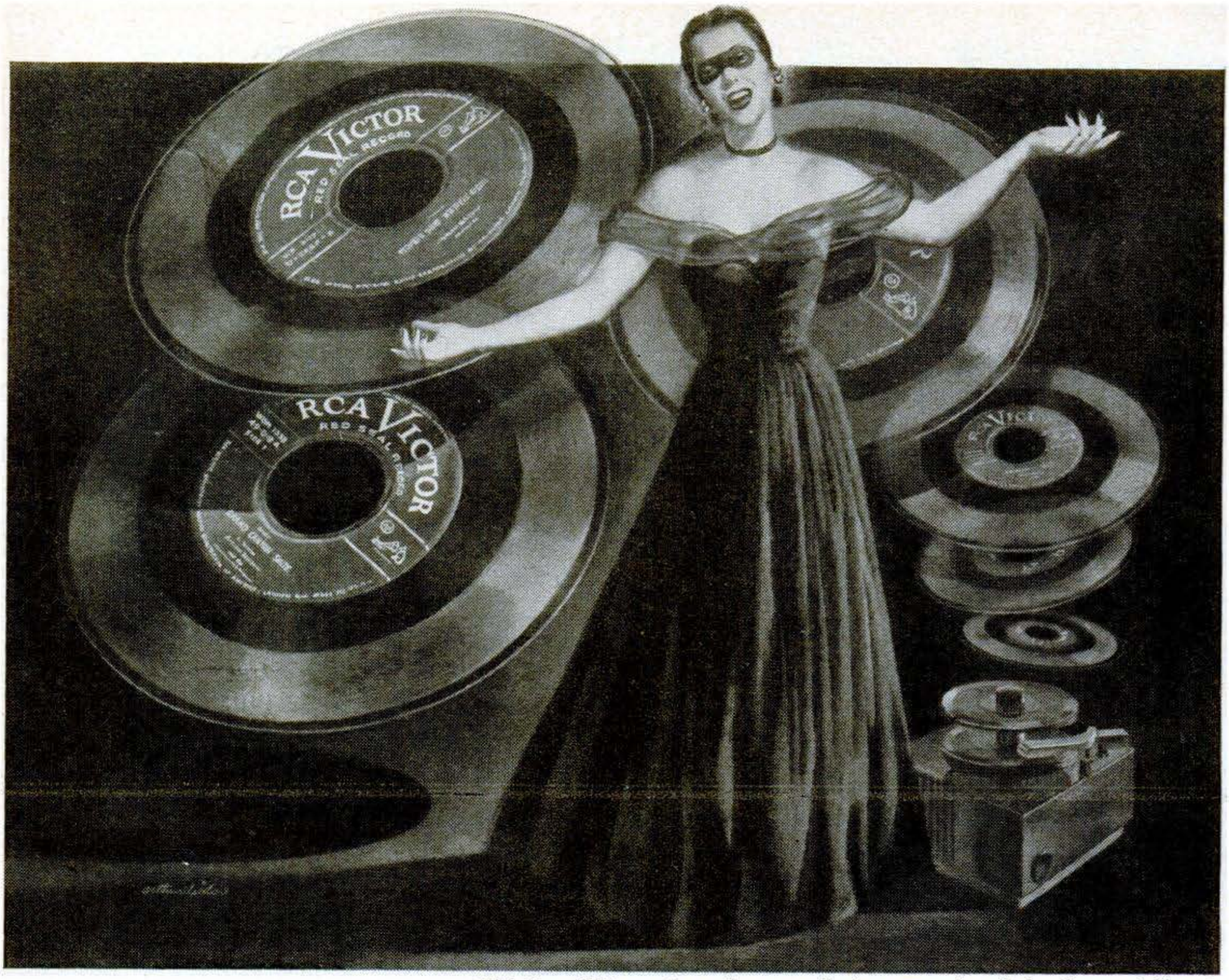
New catalog plus sample pack 4 double* ☐ or 4 single* ☐ edge blades—yours for 10¢ to cover postage, handling. *Check preference.

The Marlin Firearms Co., Dept. 87, New Haven, Conn.

Name .....

Address .....

Copyrighted material



"Madame X" was the code name, during research and development, for an entirely new system of recorded music . . . perfected by RCA.

The remarkable background of **"Madame X"**

Now the identity of "Madame X," the *unknown* in a long search for tone perfection, has been revealed. From this quest emerges a completely integrated record-playing *system* — records and automatic player — the first system to be entirely free of distortion.

The research began 11 years ago at RCA Laboratories. First, basic factors were determined — minimum diameters, at different speeds, of the groove spiral in the record — beyond which distortion would occur; size of stylus to be used; length of playing time. From these came the mathematical answer to the record's speed — 45 turns a minute — and to the record's size, only 6⅞ inches in diameter.

The record is of non-breakable vinyl plastic, wafer-thin. *Yet it plays as long as a conventional 12-inch record.* The new RCA Victor automatic record changer holds up to 10 of the new records — 1 hour and 40 minutes of playing time — and can be attached to almost any radio, phonograph, or television combination.

Not only records are free of surface noise and distortion — the record *player* eliminates faulty operation, noise, and cumbersome size, common to many. Records are changed quickly, quietly . . . RCA Victor will continue to supply 78 rpm instruments and records.

This far-reaching advance is one of hundreds which have grown from RCA research. Such leadership adds value beyond price to any product or service of RCA and RCA Victor.

RADIO CORPORATION of AMERICA

World Leader in Radio — First in Television

Copyrighted material

Prof. P. M. S. Blackett, British Nobel-prize scientist and author of the much-discussed, controversial book *War, Fear, and the Bomb.*

PS
The Voice of Science

A Professor Belittles the Bomb

IT is only human to let out that whistling sigh when your long-circling airplane comes out of the white stuff right on the runway; when your disabled car bumps safely off the pavement. Whenever fear lets go of your guts there is a tendency to say, "That wasn't so bad . . ."

Now that we have lived for a little with the unknowns of nuclear fission, it is probably only natural that some people should say, "The A-bomb isn't so bad."

It is only natural that military men, selected for courage and trained for objective sacrifice, should assess the new death only as a weapon. It is their business to counter any new threat with some kind of defense. But while no one who has shared their perils can doubt the integrity of their appraisal, it is possible to question the validity of a military solution to a broad civilian situation.

The most publicized belittler of the A-bomb is not a soldier but a scientist. It is his stature among men of science, most of whom are loud in their warning of atomic wrath, that gives the Professor's views so much weight.

Elsewhere in this issue, POPULAR SCIENCE outlines some of Professor Blackett's arguments and some of the answers (pp. 124-126). Let me urge you to read and re-read these few pages. You are going to hear a lot of people quoting and misquoting the Professor. And you ought to know that in too many areas of argument he is an expert out of his field, and therefore a layman like you and me.

I happen to disagree with Professor Blackett, but I am glad he is getting so much attention. In this lull between the atomic blasts and world understanding, we Americans have put too much faith in fear. Maybe if it were pointed at us we would be saying, "The bomb isn't so bad."

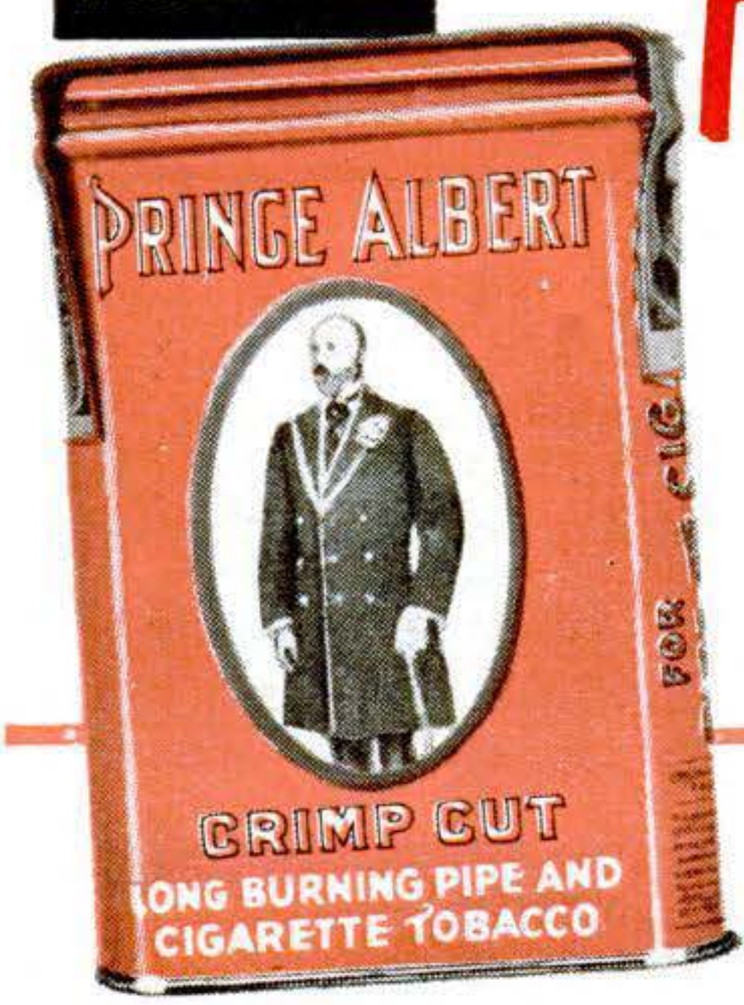
But cutting nuclear fission down to tactical size, saying the atom bomb isn't so bad, won't make war so good. Because the A-bomb as demonstrated in the Pacific and as discussed in Professor Blackett's book will be only the beginning. . . .

Perry Githerings

Copyrighted material

Of course he rates high_he's got P.A.*

NEW HUMIDOR TOP
Locks out air—seals in freshness...flavor



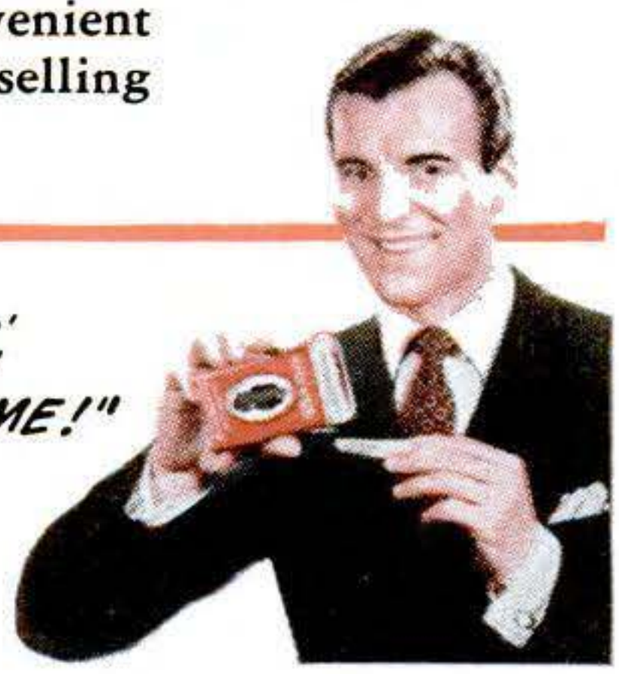
P.A.* means Pipe Appeal

The man with a pipe has an extra appeal to the ladies. Fill that pipe with Prince Albert for real smoking joy and comfort!

means Prince Albert

● There are lots of reasons why Prince Albert is known as the National Joy Smoke! P.A.'s choice, crimp cut tobacco is rich-tasting . . . and tongue-easy. Specially treated to insure against tongue bite! Get Prince Albert in the handy pocket tin or the convenient pound size. It's America's largest-selling smoking tobacco!

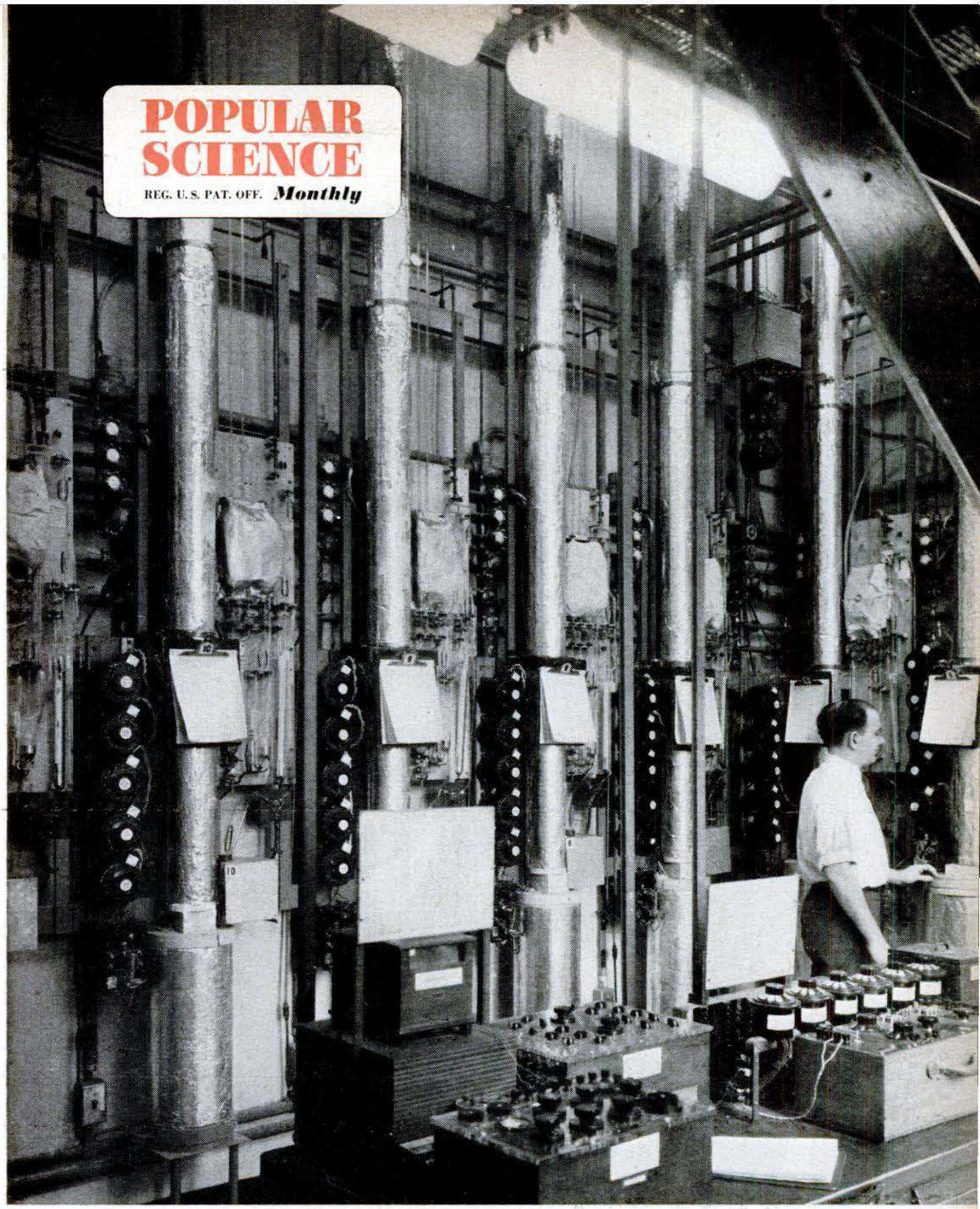
"FOR CIGARETTE 'MAKIN'S,' P.A. SURE RATES HIGH WITH ME!"



R. J. Reynolds Tobacco Co., Winston-Salem, N. C.

The National Joy Smoke

Copyrighted material

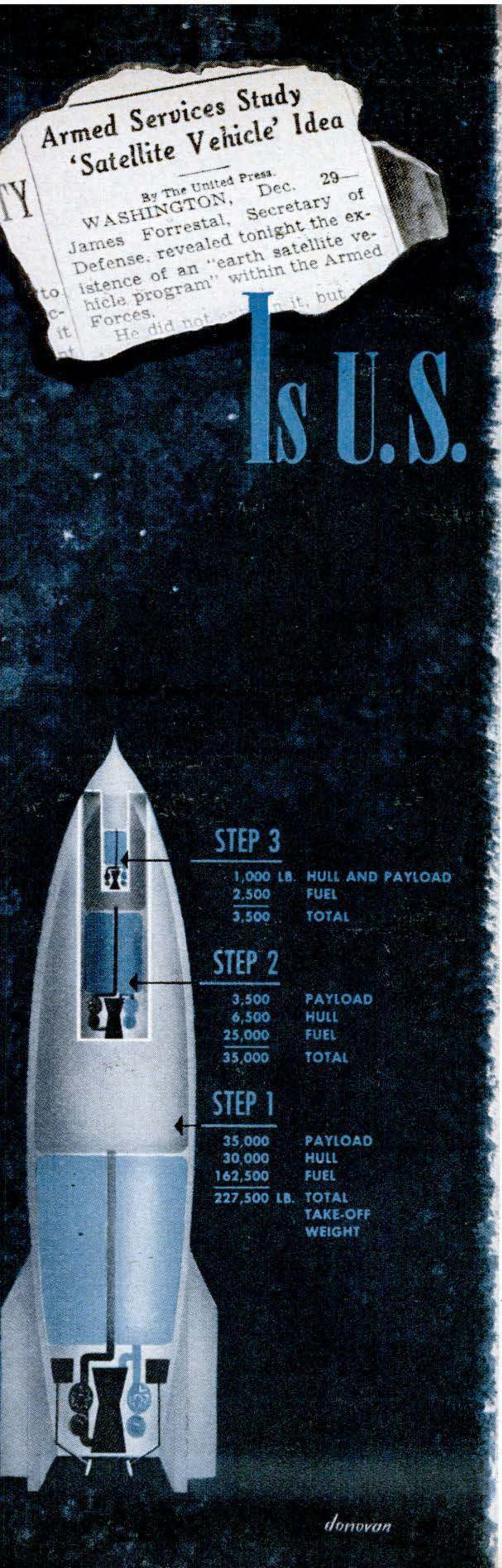


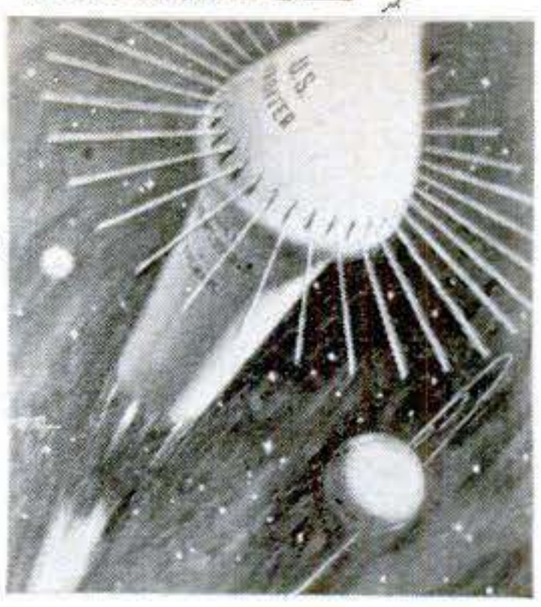
Pipes for Purity . . . Exceptionally pure chemicals come out of these silvery pipes in the National Bureau of Standards. The two-story-high pipes are automatic distillation columns that boil night and day to separate the compounds of petroleum. Each of these compounds boils at a slightly different temperature, so any one can be separated from most of the others by heating the mixture to just the right boiling point. A few compounds with almost the same boiling point vaporize at the same time, so the condenser tubes (inside tall section) are kept slightly cooler than the pot (lower section). As the vapor rises through the tubes, all the compounds but the desired one are condensed out. Oil companies use the pure samples to identify unknown compounds.

Copyrighted material

First step of 3-step rocket should carry "satellite" above atmosphere and give it a velocity of about 5,500 feet per second by time fuel in this step is exhausted. Next step should send rocket higher and increase velocity to 14,000 feet per second. Final step should boost velocity to necessary 5 miles per second. At this speed, rocket should become "second moon," circling earth like real moon.

Copyrighted material





Cover drawing by Ray Pioch

Is U.S. Building a New Moon?

One rocket has already pierced the earth's atmosphere; a faster one might leave it and circle forever.

By Willy Ley
Author of "Rockets and Space Travel"
Drawings by Jere Donovan

THE *Secretary of Defense has co-ordinated "earth satellite vehicle" research by the Army, Navy, and Air Force.*

A 3,000-mile rocket-testing range has been requested.

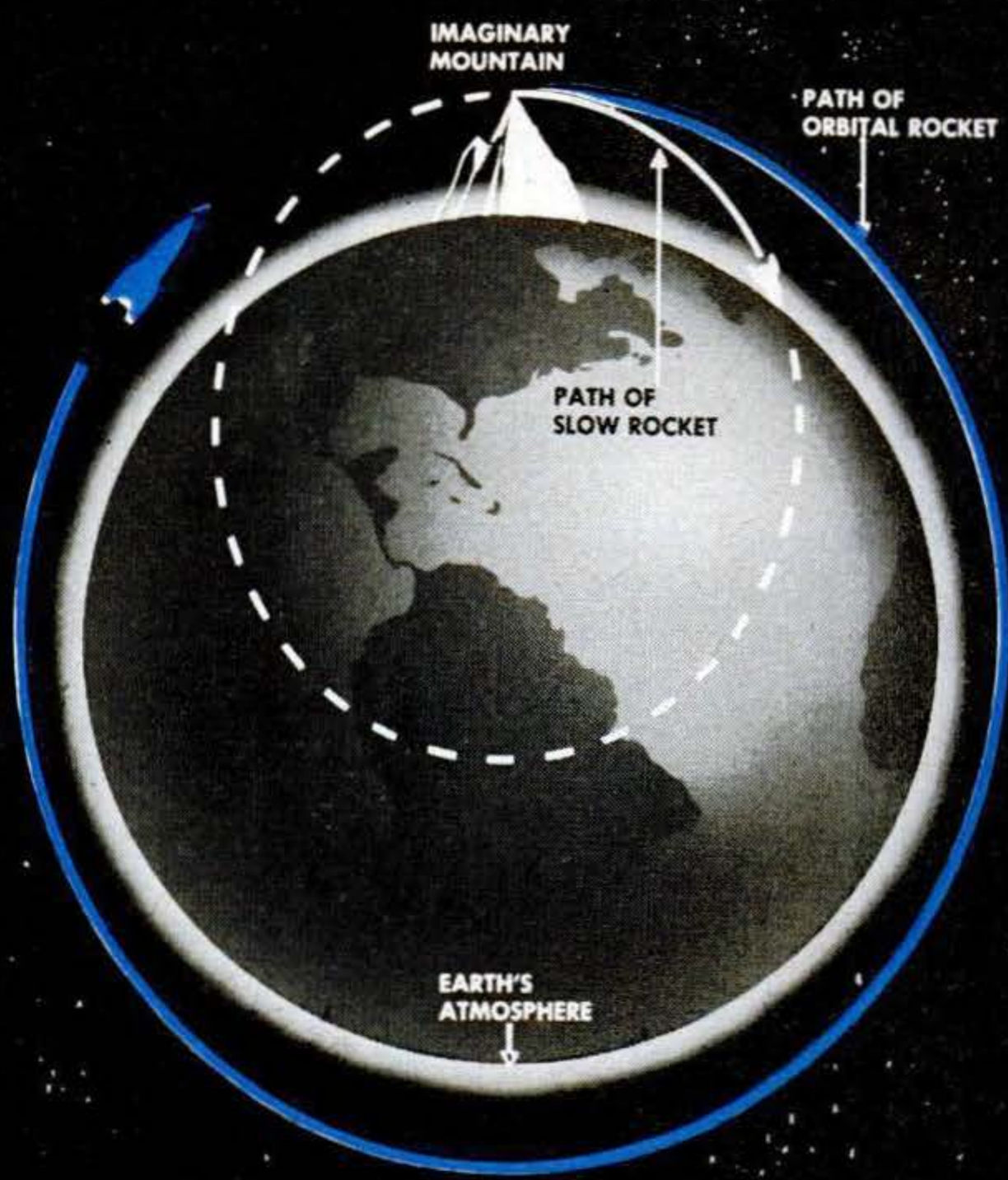
Curtiss-Wright foresees a 10,000-m.p.h. "space ship."

Lockheed's chief engineer says: "Escape from the earth is far closer than most people think."

SUCH revelations made POPULAR SCIENCE editors ask: Is the United States now building a new moon?

No hints as clear as some of these preceded the first A-bomb's shock wave. Space ships, defense officials now say, are "a matter of highest secrecy." So the men who know exactly what's coming up and when are mum or enigmatic. Some of the rumors you may have heard, and some of the headlines, have been preposterous. But, beyond a shadow of possible doubt, American scientists and engineers are working on an "orbit-

Copyrighted material



Imaginary mountain, towering high above earth's atmosphere, represents point in space where orbital rocket would be launched. Any slow-moving rocket fired from top of this mountain would eventually strike the earth, since it would fall faster than the earth's surface would curve away beneath it. When velocity is 5 miles per second, however, distance rocket falls exactly equals distance earth's surface curves away—eight inches every mile. Thus, though rocket keeps falling toward the earth, the earth keeps bending away from it, and it can never land. Broken line shows how path of slow rocket, if continued, would form ellipse; path of orbital rocket would form ellipse in same way.

er" to spin around the earth like the moon.

A 10,000-m.p.h. space ship might fly around the world, but it would not be, and could never become, a genuine satellite. Even if it were driven by atomic energy, such a go-cart would eventually have to be refueled. The moon doesn't need any fuel. Nor could a 10,000-m.p.h. craft ever slip out of the grip of the earth's gravity. To do that, you'd have to go over 25,000 m.p.h.

Before some Tom, Dick, or Harry takes off like a character in fiction, however, a second moon is likely to become one of the many ramparts watched by America's armed forces.

It won't have anybody in it.

It will never need more fuel.

It will be much smaller, closer, and faster than the moon that makes men croon, but it will be bound just as tightly to Mother Earth's apron strings.

How soon a moon like this will hang overhead depends pretty largely on how much money is spent how fast. I believe that without making a noticeable dent in the national budget an orbiter of this type could be planted in the sky within 10 or 12 years.

Once a projectile was out in space, a shove of 18,000 m.p.h. would be enough to keep it going around and around like the moon. That velocity could be attained with "step rockets," which are simply two-in-one or three-in-one rockets.

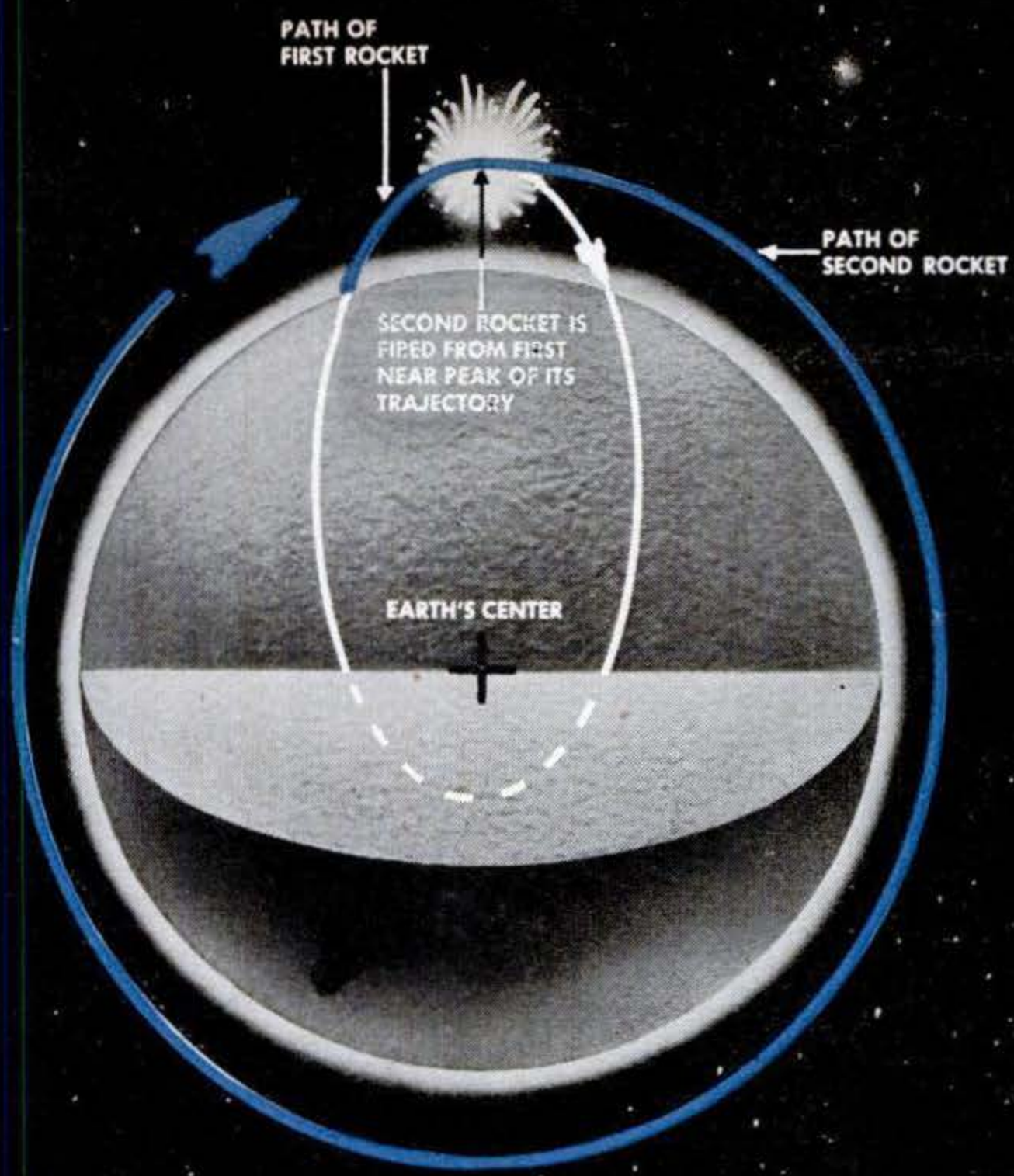
Such rockets are the only known kind that could make full use of a testing range 3,000 miles long. And that, you cannot be criticized for noting, is the length of the range that U. S. defense chiefs now want.

Two-Step Rocket Tried

Much research along this line has already been done (see "Going Up for Keeps," PS, March '47, p. 66). Late last February, the Army set off a two-step rocket at White Sands, N. Mex., that reached an altitude of 250 miles and a velocity of 5,000 miles an hour, both record achievements. Much more research, however, remains to be done.

The sketches on pages 106 and 107 show how a three-step rocket might plant a small, manless moon in the sky. The sketches on these pages show why a velocity of 18,000 m.p.h., which is 5 miles per second, would keep it up until doomsday if nothing knocked it off its course.

Copyrighted material



Using two rockets, one fired from the other, would accomplish same thing as launching single rocket from imaginary mountain on previous page. First rocket, fired nearly straight up, would carry to well above earth's atmosphere. Then second rocket, fired from first one near peak of its trajectory, would be placed in path almost at right angle to earth's radius. This rocket, traveling at 5 miles per second, would then enter permanent orbit around earth while first rocket dropped back. Actual attempt would probably require 3-step rocket, but principle would be the same. Note that two rockets' elliptical paths would both have earth's center as one of their two focal points.

A cargo of instruments permanently placed above the blanket of air in which we dwell could tell us a lot of things that no one knows now. If, say, the instruments were to weigh 200 lb. (which is a lot of instruments nowadays), and the cart in which they were placed were to weigh 800 lb., they could be accelerated to 18,000 m.p.h. by a step rocket weighing a trifle less than 119 short tons.

This could be done with known fuels. How the total weight would be divided among the three parts of the rocket is indicated alongside the drawing on page 107. I have assumed, in these computations, that in each step the ratio between the total fueled weight and the combined hull and payload weight would be 3.5 to 1 and that the velocity of the exhaust blast would be 7,500 feet per second. These are plausible assumptions, and my conclusions are based on Newton's third law of motion.

The rocket the artist has pictured would be 120 feet tall, about the height of a 10- or 11-story building.

Such a monster does not seem fantastic when you recall the disclosures since the war. A V-2 rocket is 46 feet high and weighs 15 short tons when it takes off. The Nazis were found, however, to have a far bigger job in the works. Intended to cross the Atlantic and bombard us, it was to be a two-step rocket with a take-off weight of 93 short tons (PS, Oct. '47 p. 108).

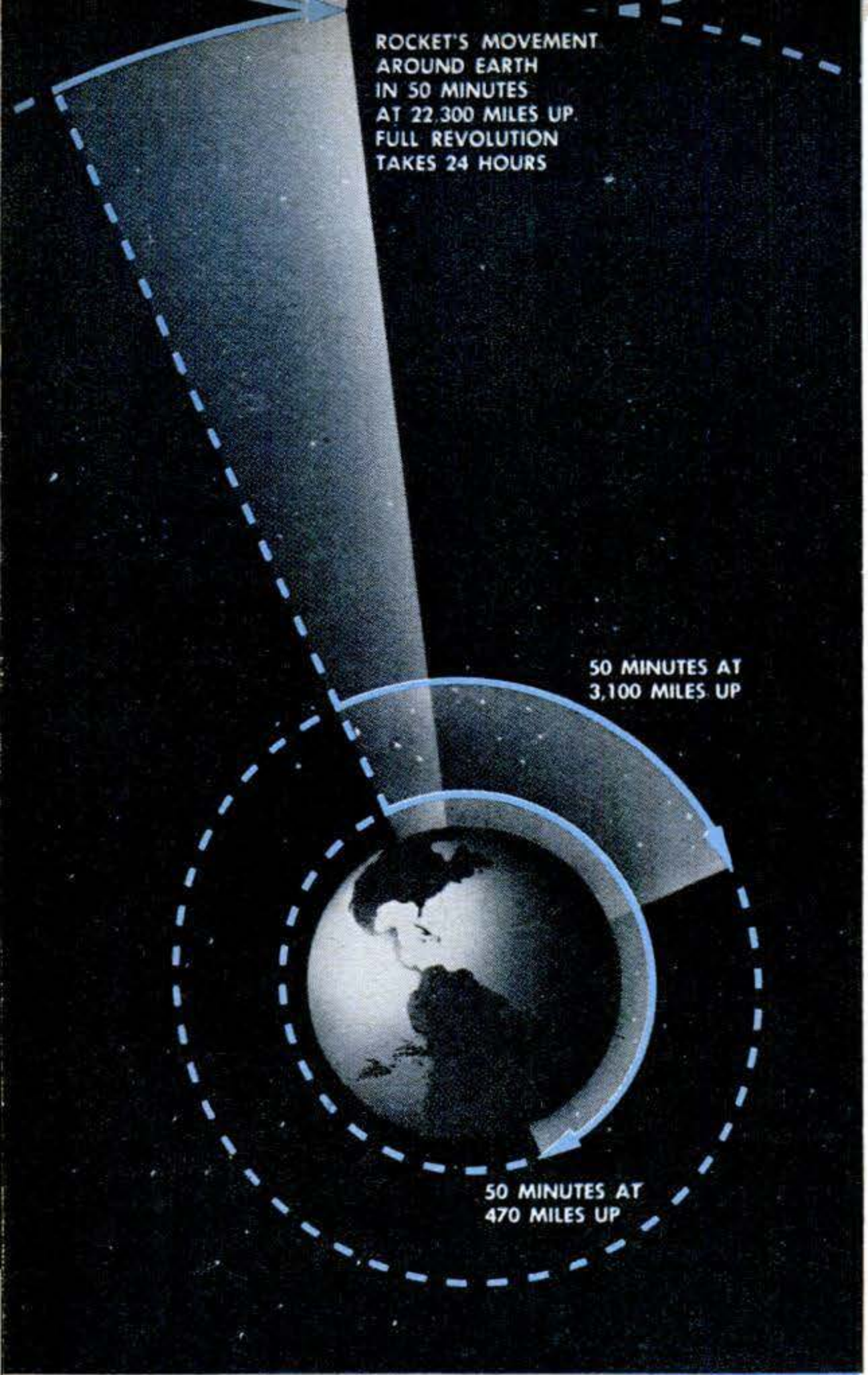
The Germans knew that step rockets would actually work. They used a small, three-step, solid-fuel rocket called the Rheinbote ("Messenger from the Rhine") for long-range bombardment work during the battle for Antwerp. That American experts who have picked the Germans' brains are working on booster rockets is no secret (see p. 116).

To an uninformed bystander, a three-step rocket capable of delivering a half-ton moon might look like a single one. Since the two inner rockets would operate above the atmosphere, they need not be streamlined. They could be fitted into the hull of the first big booster without a cubic inch wasted.

Such a mighty missile's ascent would begin rather slowly. The air would offer less resistance as it climbed and it would gain speed faster. At 30 miles up, it should be going about a mile a second.

To get it out of the dense, lower atmos-

Copyrighted material



Time required for orbital rocket to make complete revolution about earth depends only on distance away, which determines how far it must go to get around. Drawing above shows orbiter's movement at three different altitudes. At 22,300 miles, rocket would take 24 hours to complete full revolution and would thus appear fixed over earth. At 3,100 miles, it would require 200 minutes; at 470 miles, only 100 minutes.

phere as quickly as possible, the rocket probably would be shot straight up. Then the trajectory could be slowly tilted. The deviation from a vertical path might not be more that 15° during the first step. This tilting from the vertical might increase during Step 2 and continue to do so in the final step until the rocket traveled along a line at a right angle to the radius of the earth during the last few seconds of its fuel's burning time.

But for the resistance of the air when the rocket first left the earth, it should be going 5 1/3 miles per second then. That's over a third of a mile per second faster than necessary, but much of this excess would have been lost while the rocket was passing through the atmosphere.

At a velocity of 5 miles per second, the rocket's directional inertia—the tendency to keep on a straight path—would combine with the force of gravity—tending to pull it earthward—to set it on a curving path around the earth. These forces of inertia and gravity keep the moon in its orbit and the planets in theirs, and they would keep this scooter full of instruments circling the world in a similar orbit.

The trajectory of every long-range or high-altitude rocket is an ellipse, and in every case one of the two focal points of the ellipse coincides with the center of the earth. The orbiter would be no exception. Its orbit would be an ellipse, but this ellipse might be so short and fat that in a small drawing it would look like a circle.

The time required for a complete revolution around the earth would be governed by a single factor: the new "moon's" distance from the earth. The farther it is from us, the longer it will take to go around.

Choose Your Orbit

If the distance from the ground were 470 miles (probably the minimum if we want to be sure to avoid even the last faint traces of air resistance), each complete revolution around the earth would take 100 minutes. This has the interesting result that the orbiter, when observed as a star, would "rise" in the West and "set" in the East. (It is assumed that it will be launched so that it would circle in the same direction as the earth rotates.) If its orbit were in the plane of the equator the rocket satellite could not be seen at all from higher northern and southern latitudes because the bulk of the earth would be in the way of the observer.

If the "orbiter" were to be placed 22,300 miles from the earth's surface, it would neither "rise" nor "set" because it would need just 24 hours for one revolution and therefore seem to stand still over one spot. While this might be amusing, the scientists would probably prefer to have their sky wagon move with respect to the ground.

It also would be advisable for several reasons to have the rocket closer than 22,300 miles out, the limited range of the telemetering instruments being one of them.

One of the many mysteries that the instruments could clear up is the temperature the orbiter itself would assume. Space itself, being empty, cannot have a temperature, but

Copyrighted material

everything material put into space will assume one, since it will receive radiations from the sun and radiate energy in turn. How much will be absorbed and how much will be re-radiated will depend on the orbiter's surface smoothness, its heat conductivity, its color, and many other factors.

Another interesting phenomenon would be the drop in temperature when the orbiter entered the shadow of the earth, as it would once during every revolution. Knowledge of this temperature fluctuation would be of great interest to designers of long-range missiles that might take off at night in the earth's shadow and then leave it, or vice versa.

Would Aid Solar Research

The instruments on the new space sled could also relay a complete spectrum of the sun. Spectra taken on the ground lack large sections that are cut out by the atmosphere. More complete spectra have been obtained by means of high-altitude rockets, but these rockets stay at a high altitude for only a very short time, and their attitude at peak altitude cannot even be guessed in advance.

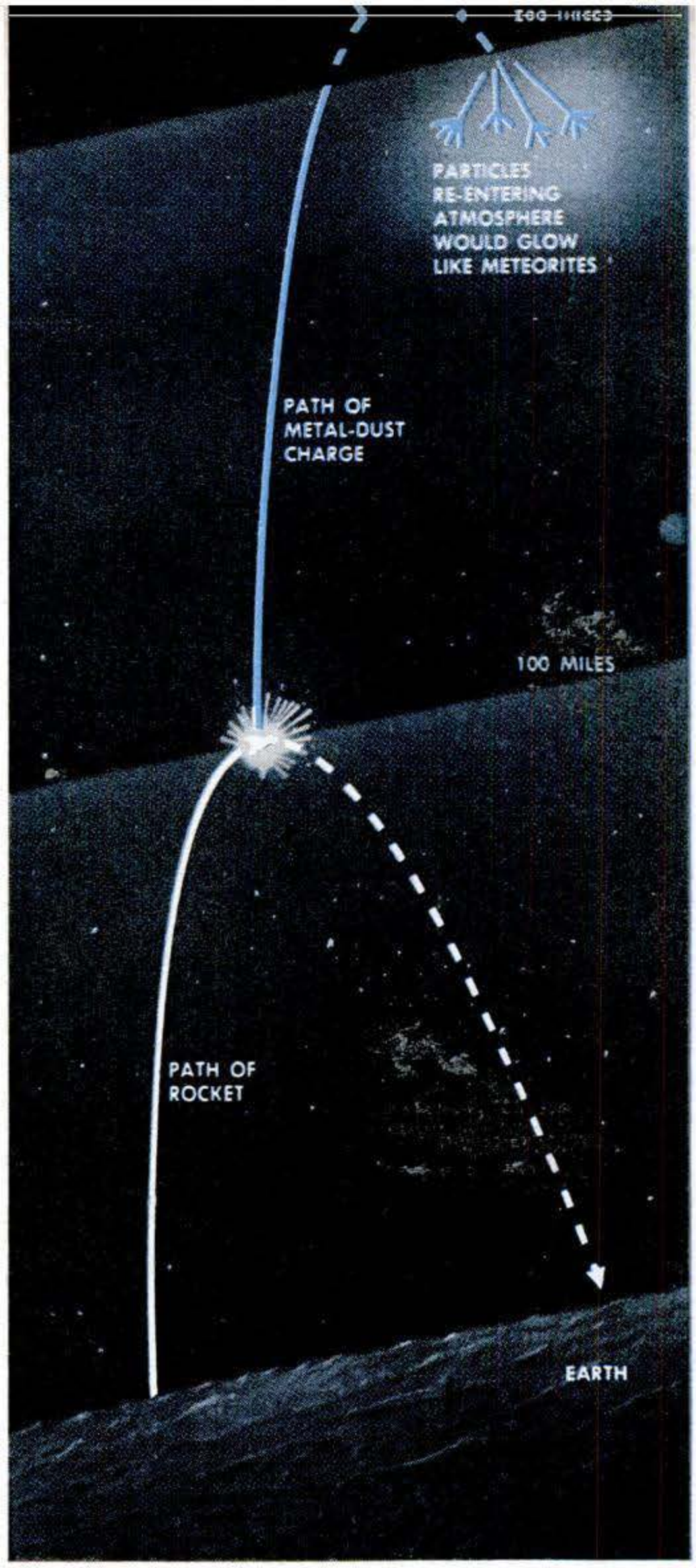
Another item of solar research the orbiter could help explain is sunspot activity. Scientists suspect that clouds of ionized hydrogen gas from the sun wander through space. The orbiter's instruments could provide definite information about them.

It might also be possible to equip the new moon with an instrument to send out a special signal if the rocket should be hit by a meteorite. That would settle, once and for all, the perennial question of the probability of getting your skull smashed by a meteor when you stick your head out of the earth's atmosphere.

Such an instrument probably would not be set off by the impact of individual particles of cosmic dust, but in time these might change the temperature of the rocket by reducing its light-reflecting power. If the effect should be very strong, which is unlikely, it could even reduce the orbiter's visual brightness.

To send findings back to the ground, the instruments would need a source of power of some sort. Batteries might not last long enough. It might be possible, however, to obtain the necessary power from the decay of radioactive substances in a manner that, if developed, would certainly be top secret.

Perhaps the sun's energy could be used for this purpose. It should be possible to devise thermoelements that, when heated by the sun at one end, would produce enough electric current for this purpose. Rather long antennas could be provided quite easily by having coiled-up steel wires in the head that would be released after the acceleration of the rocket stopped, sticking out as shown on the cover. These wires would also increase



Attempt to put "artificial meteorites" into space was tried by Army more than a year ago by firing "shaped charges" from the head of a V-2 (PS, March '47, p. 66). Consisting of a sheet-metal "liner" blasted apart by high explosive, the charges produced a high-speed jet of fine metal dust. It was hoped that some of the metal particles, fired from the V-2 100 miles up, would carry an additional 100 miles or more, leave the atmosphere, and then be detected upon re-entering. Whether or not experiment was successful has not as yet been made public.

Copyrighted material

the size of the orbiter and make it a better radar target.

This brings us to the "passive" uses of such a vehicle—uses that would result simply from its existence. The problem of guiding very long-range missiles—say 3,000 miles or more—always raises the question of reference points. Astronomers are apt to point out that the star Regulus would be a fine reference point for various reasons. That would no doubt be true for space ships manned by navigators trained to recognize Regulus when they saw it. But a mere guiding mechanism might conceivably be fooled by a few dozen other stars. Even a robot, however, should not mistake an orbital rocket, from which a radar signal could be bounced back, for a distant star.

Navigating by Orbiter

Designers of guiding mechanisms for missiles are working on four methods. One is a two-beam system, with one beam on the target and one on the missile to provide it with orders that originate on the ground. The second is a one-beam system in which the beam is put on the target and the missile's mechanism is so designed that the missile returns to the beam whenever it accidentally leaves it. The third is the so-called "homing" mechanism. And the fourth is to teach the missile to do its own navigating. But when the navigation must be done over very long distances, it must be celestial navigation—and that is where an orbital rocket could be helpful.

It could perform similar service, of course, for a human navigator. If the orbiter could be made "visible" (not necessarily to the eye) to navigators of ships and aircraft, it would be a fine reference point for them. These human navigators have reference points now in the natural celestial bodies, but navigating by them at high speeds with portable instruments is not easy. An orbiter traversing almost two degrees of arc every half minute, along a predetermined course, would be a big help.

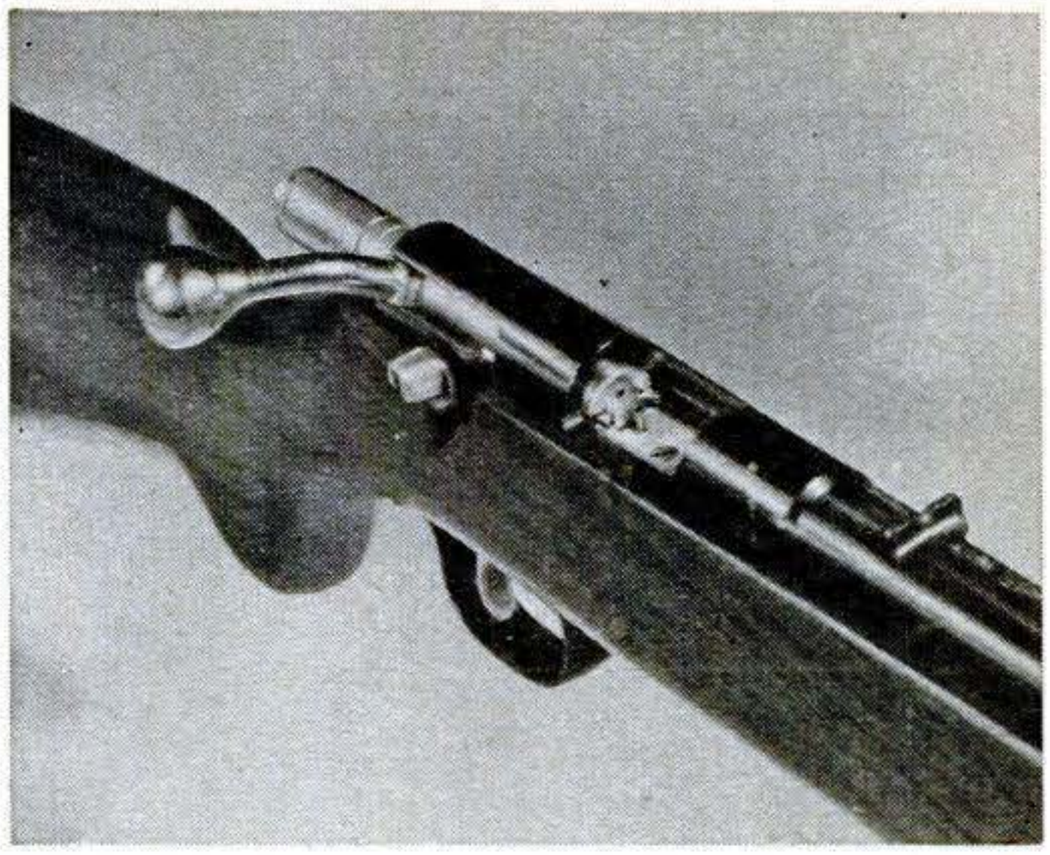
The idea is old. Computing the natural moon's orbit is such a tedious, difficult task that a French astronomer suggested a century ago that there ought to be a second smaller moon. None was ever found. But you may live to travel in a 10,000-m.p.h. plane, led to its destination by a man-made moon that simultaneously is radioing essential information to the engineers designing a ship for the first flight to Venus. END

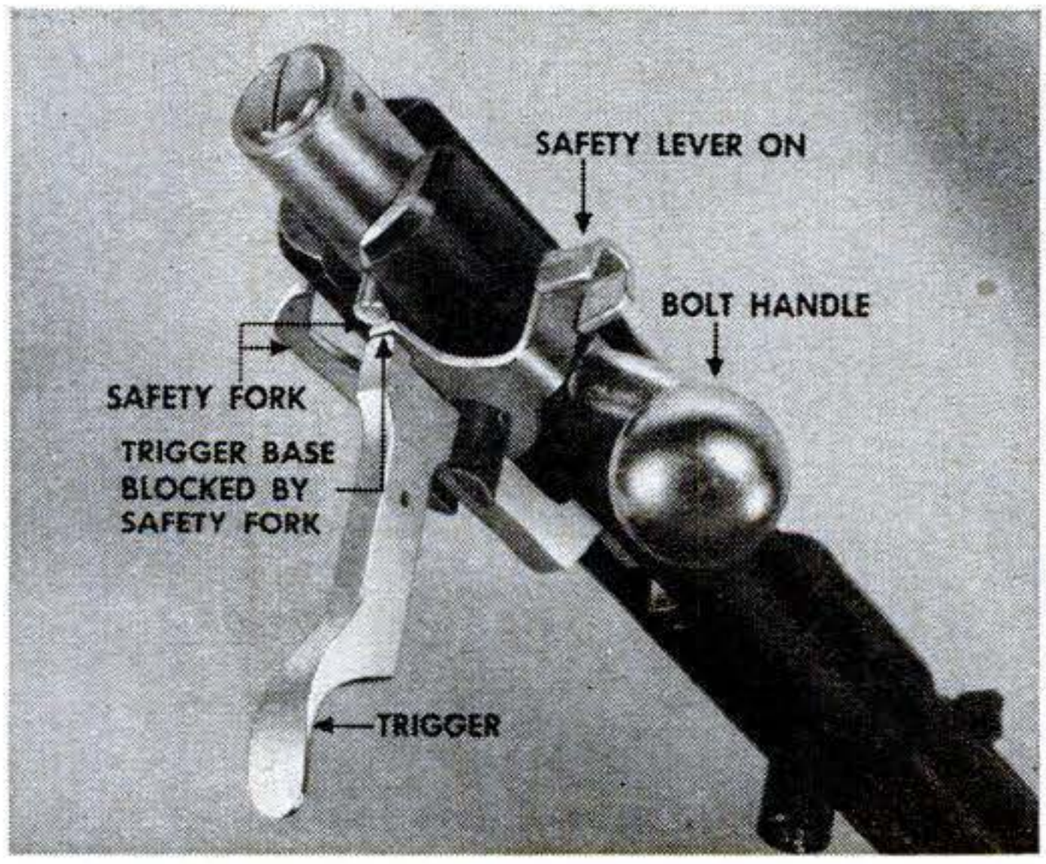
Army's two-step rocket cleared most of earth's atmosphere when it reached record height of 250 miles. Consisting of small Wac Corporal fired from nose of larger V-2, it also hit record speed of 5,000 m.p.h. Orbiter would have to go 3½ times faster but less than twice as high.

Copyrighted material

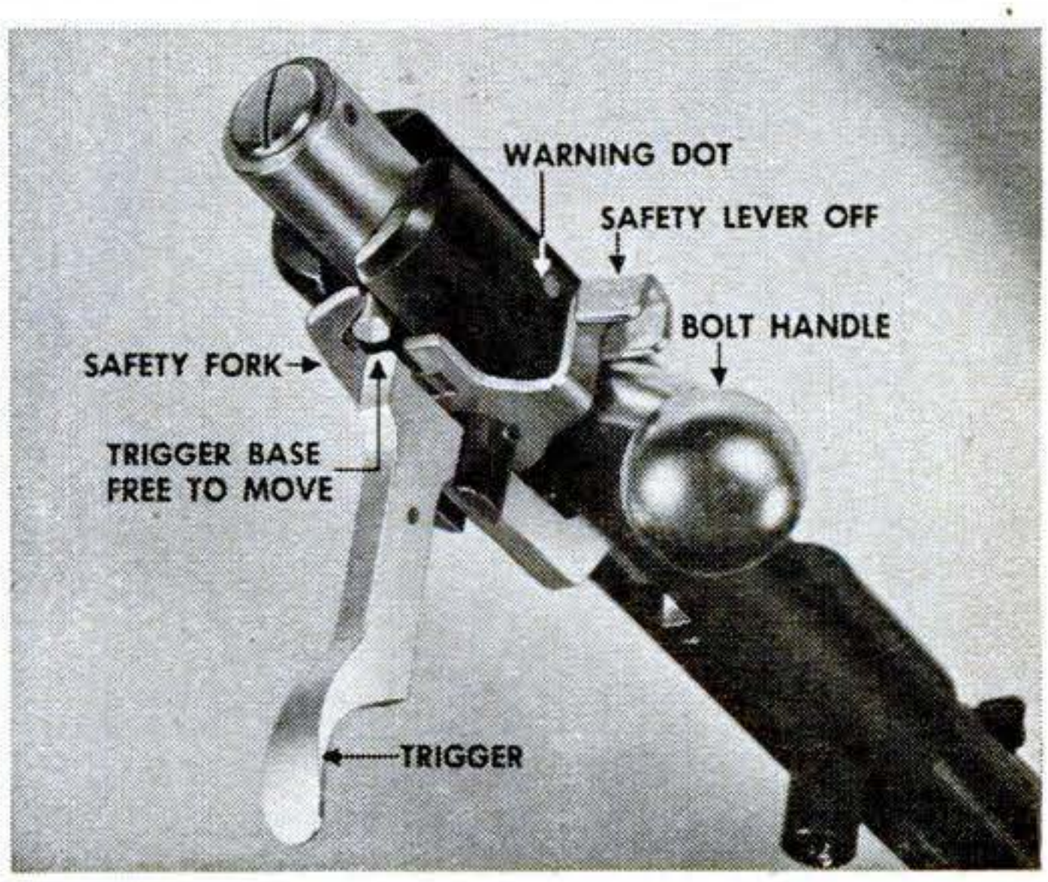
Rifle Safety Can't Forget

HERE's a rifle that you can't load without automatically locking a fool-proof safety device. It is a new .22-caliber, single-shot, bolt-action Winchester (right) designed especially for young and inexperienced shooters. The very act of loading, pulling back the bolt handle, makes it impossible to fire the rifle. And with the cartridge in place, you can't shoot it until you manually push back the safety lever, uncovering a red warning dot. The Model 47, taking either .22 short or long cartridges, with a choice of sights, sells for around $20.





The action of loading, as illustrated in above photo, pushes back forked safety lever. One tine of the fork gets in the way of trigger base and prevents it from hitting the firing pin.



With safety lever forward in firing position, fork moves aside and trigger base is free to move upward between tines to strike the firing pin. Cartridge cannot be locked if safety is off.

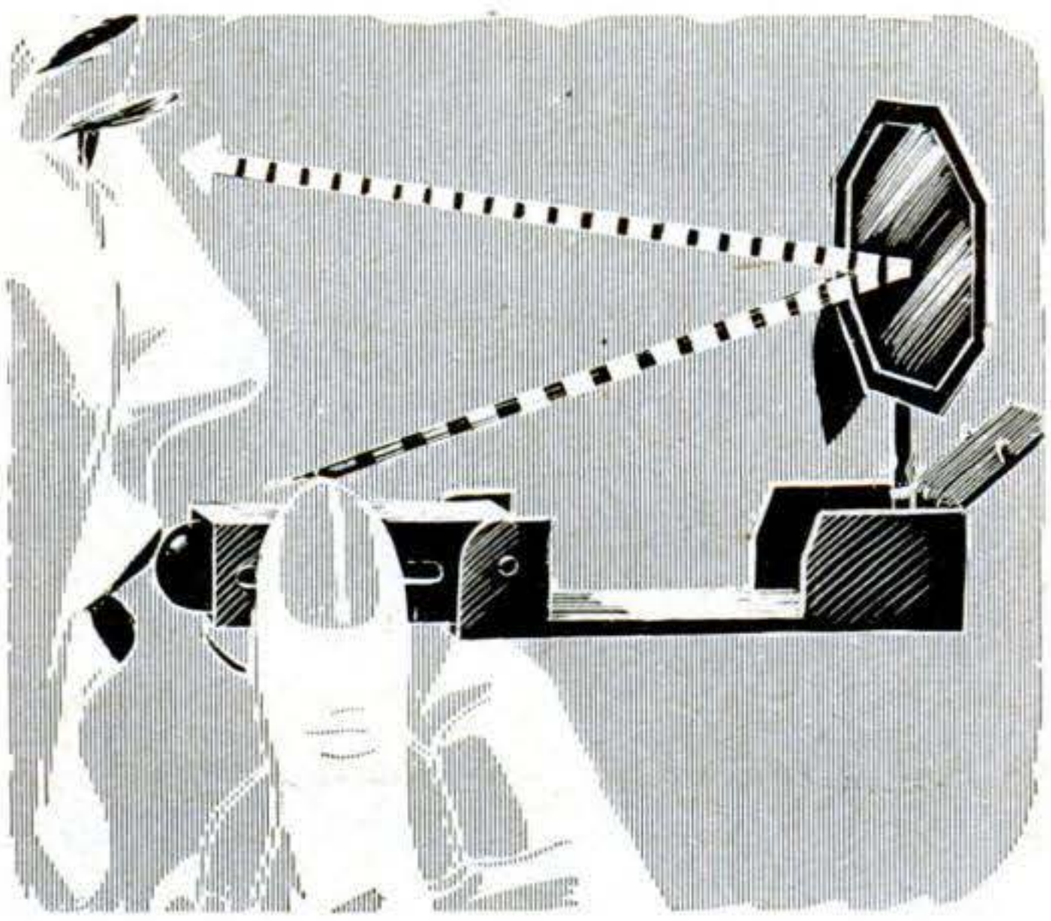
Parajumpers Carry Own Teletypewriter

A LIGHTWEIGHT portable teletypewriter, weighing only 45 pounds, is the Signal Corps' answer to front-line communications problems. It can operate on both wire and radio circuits, sending and receiving 66 percent faster than older types. It is light enough to be carried on a jump by a paratrooper. A power unit and case only bring its total weight up to 116 pounds, as against 400 pounds for present models.

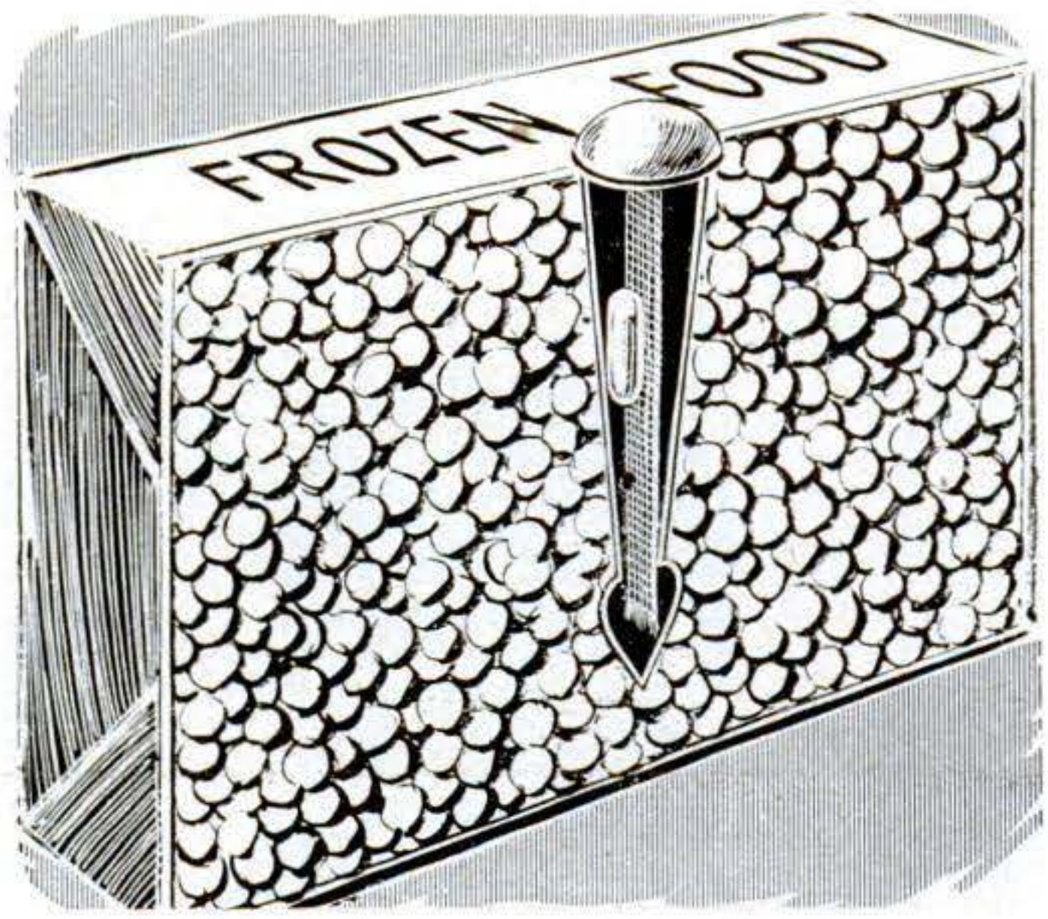
Copyrighted material

New Ideas from the Inventors

Spoilers Smooth Landings. If you came down in this plane, you'd stay down. "Spoiler" vanes on top of the wings are automatically raised just as the plane lands, cutting its lift and keeping it from "bouncing." The spoilers are actuated by the movement of the shock absorbers as the wheels strike the ground. For take-offs, they lower when throttle is opened. E. M. Gardner, of Barberton, O., is the inventor.



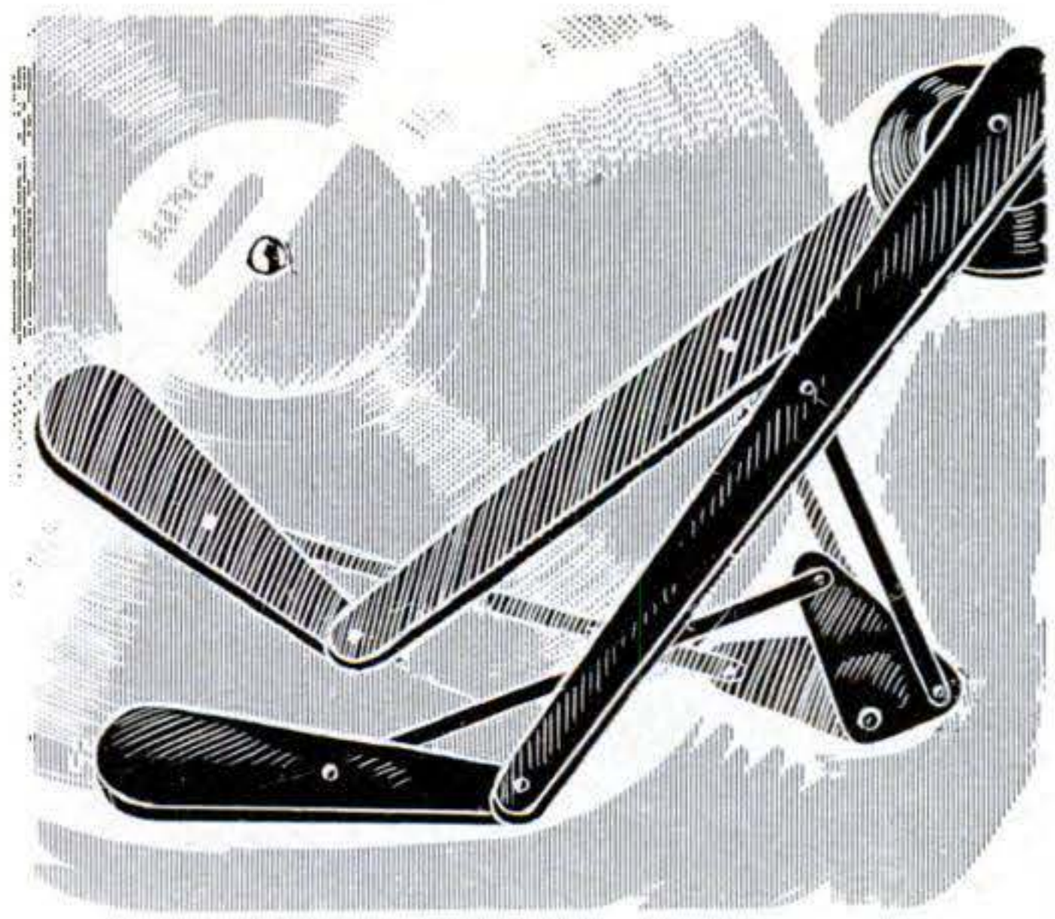
Lipstick Has Mirror. Women would have less trouble getting their lipstick on straight with this novel container. Patented by D. Macy, of New York City, it has a small mirror that opens out at the end of the lipstick, keeping the user's lips constantly in view. When not in use, both lipstick and mirror fold compactly together.



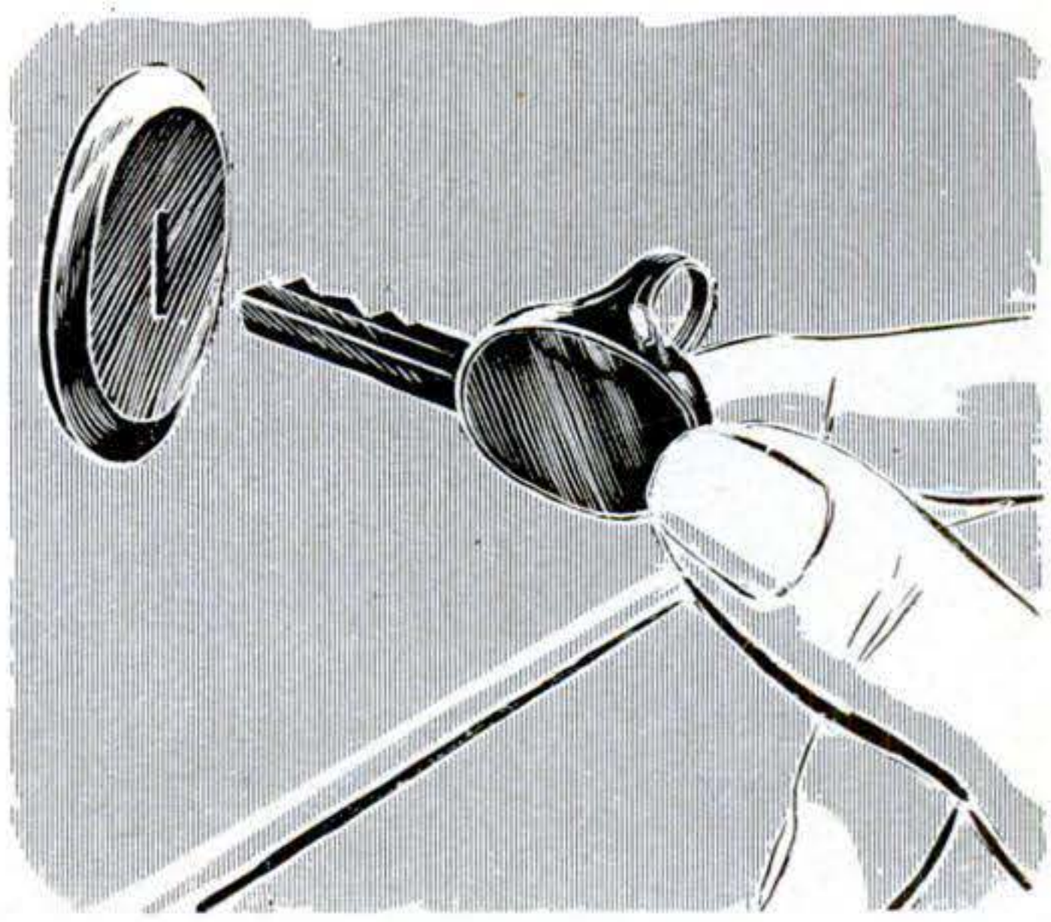
Chemical Warns of Thaws. This telltale would reveal if a frozen-food package had thawed inside and been refrozen. With the food, a capsule of water is frozen, bursting its walls. If the food thaws, the ice melts, and a wick wets a chemical, visible through the wrapper, changing its color. Inventor is K. Chase, of Wilmington, Mass.

Copyrighted material

Tire Support Speeds Changing. This simple support would save wrestling with a heavy car wheel while trying to put it on. Just rest the wheel on the end of the arm and slide the whole thing under the car. Pushing down on the spring-action arm allows the tire to be slipped under the fender. Letting go then raises the wheel so it can be placed easily on the axle. J. A. Laclair, of Flat Rock, Mich., is the inventor.

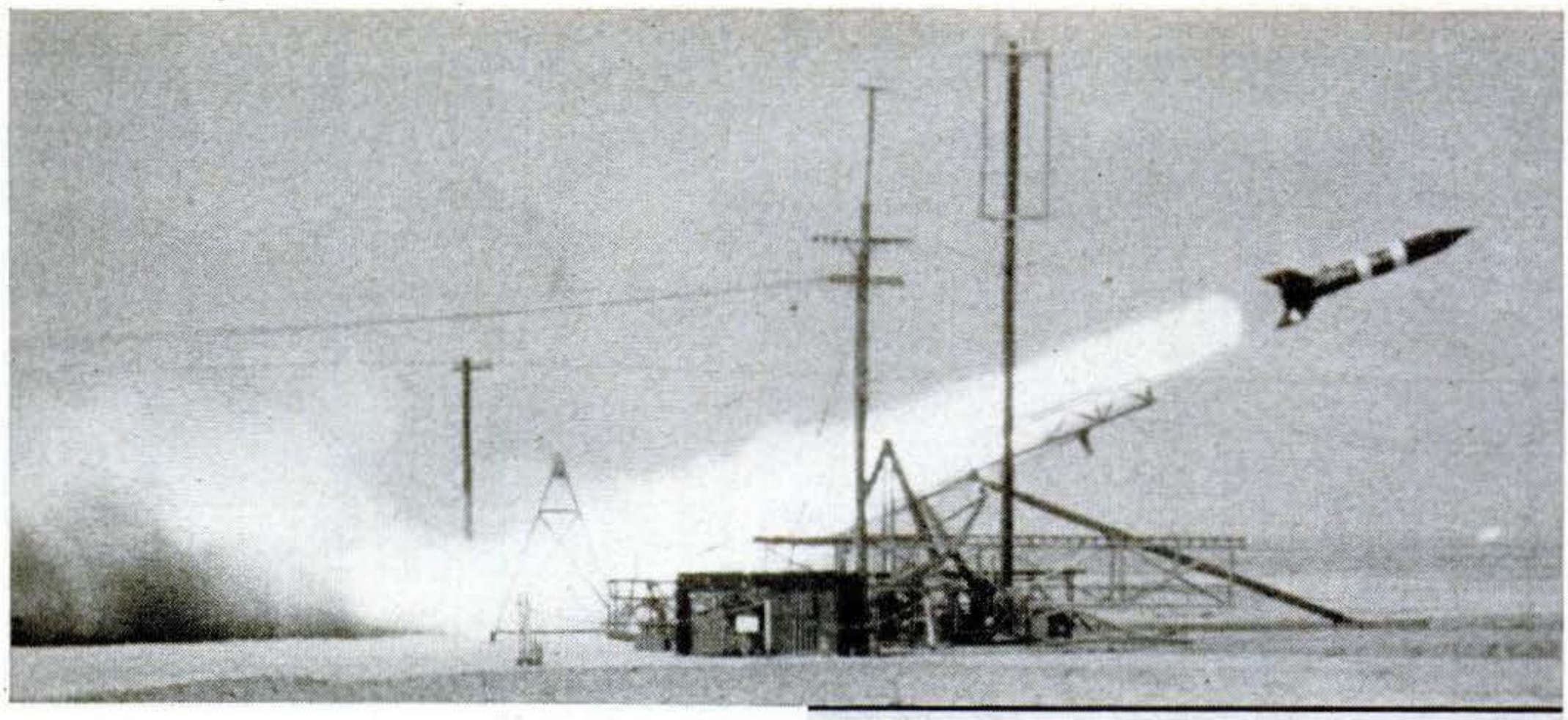


Tone Arm Cuts Distortion. This tricky phonograph pickup arm, invented by H. L. Shortt, of White Plains, N. Y., is designed to eliminate tracking distortion by always following a record's grooves at an exact tangent. As the pickup head moves inward, rods connecting the two parts of the hinged arm turn it to keep it tangent.



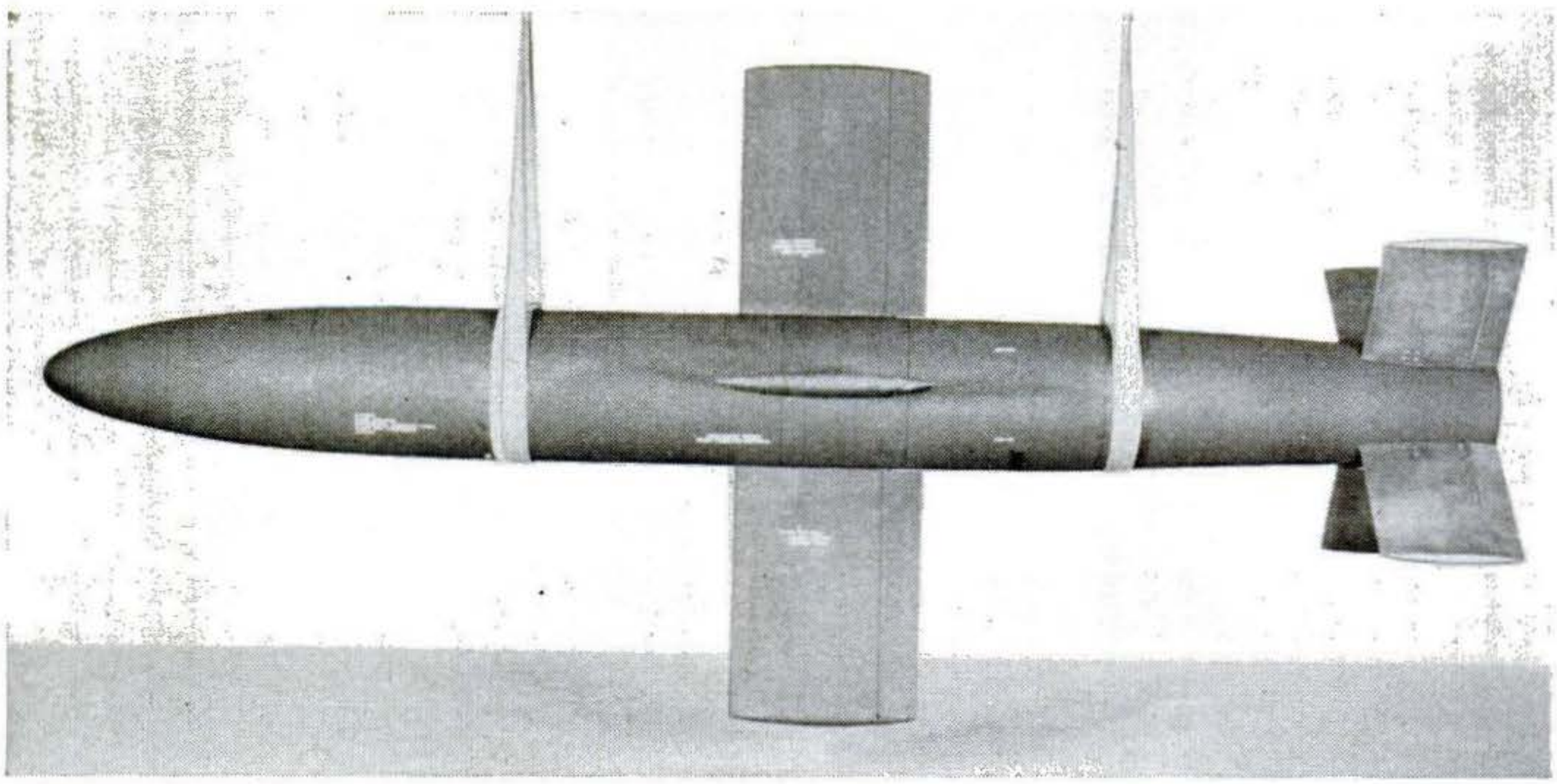
Finger Ring Holds Key. You'd be less likely to lose or forget that vital house key if you kept it in this novel finger ring. Invented by H. H. Boscowitz, of New York City, it holds a key that slides out from a recess in the underside. When extended, the key is locked by a spring catch, keeping it from sliding back when pushed in the lock.

Copyrighted material



Swift Kick for Missiles

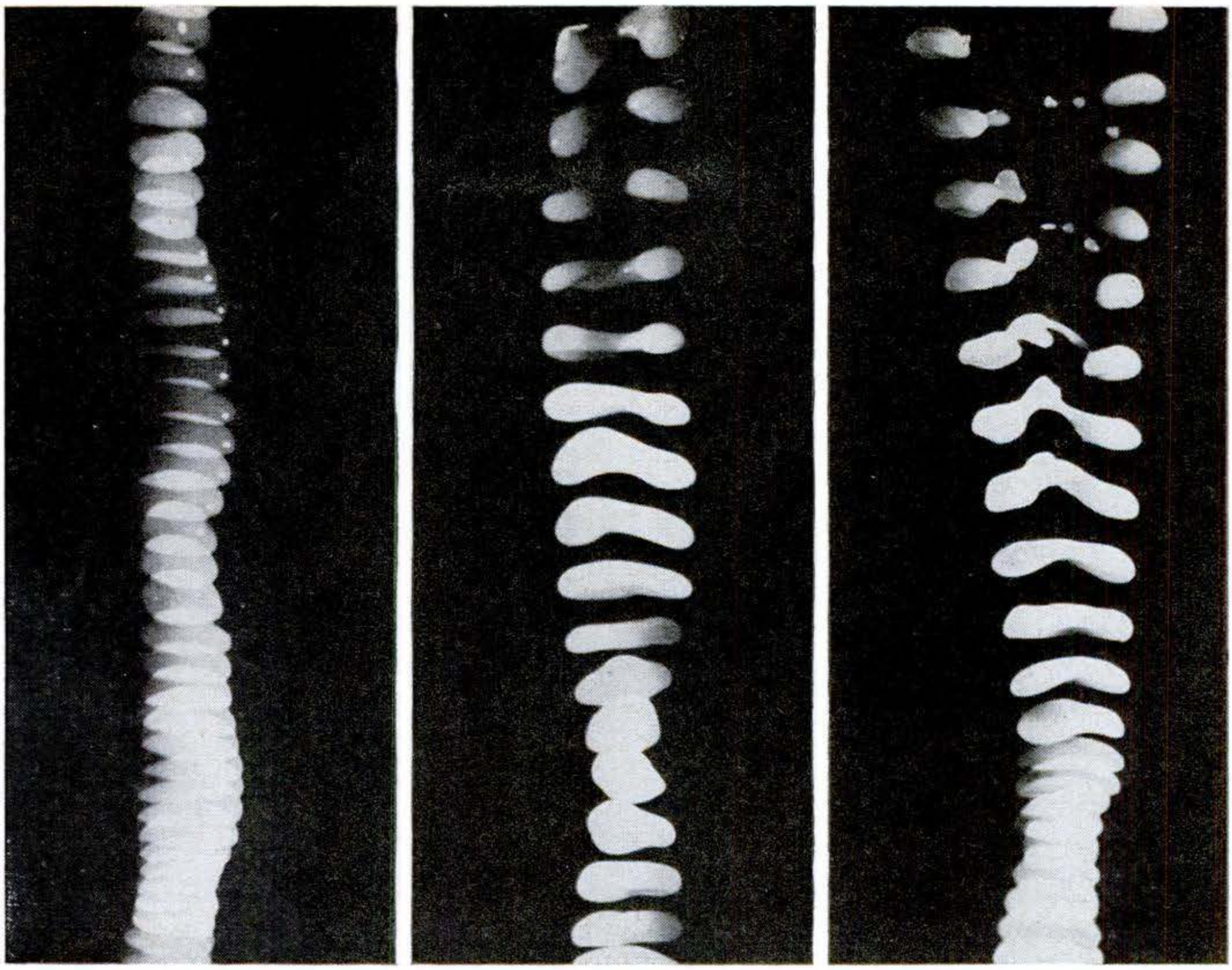
THE Navy's newest booster rocket, with a speed of more than 1,500 m.p.h., will get supersonic missiles off to a good start. It is designed especially for launching ramjet missiles that must reach near-supersonic velocity before they can operate efficiently. As shown on launching ramp at right, the solid-fuel rocket has a dummy nose. When the rocket is used as a booster, however, it will be attached to the tail of the main missile, then dropped off after the ramjet engine reaches self-operating speed.



Secret Weapon Previewed

SHOWN above, posing on its way for delivery to the U. S. Navy, is the Lark, latest weapon of push-button warfare. It is a ship-to-air, rocket-powered guided missile, controlled automatically in flight. That is all the Navy will say about the new weapon, intended to knock targets out of the air, except that it has been designated the XSAM-N-2. Research and development is by Fairchild Engine and Airplane Corp.

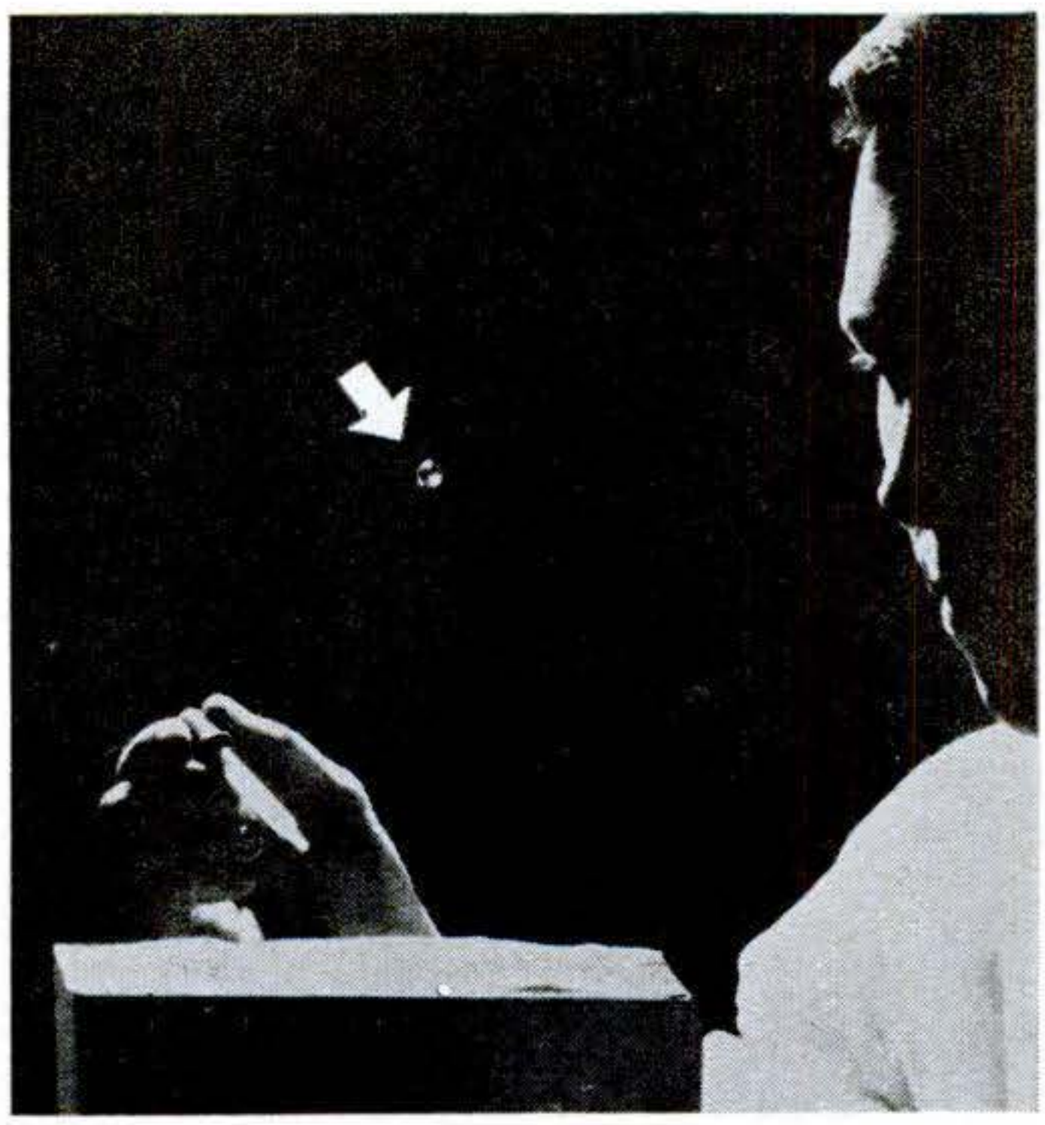
Copyrighted material



Multiple high-speed photos, beginning at bottom, reveal successive shapes of a raindrop buffeted by air stream as in falling from sky. Pictures illustrate typical button-shaped drop; "dumbbell" drop dividing in two; and "phone-set" drop breaking into large and small pieces.

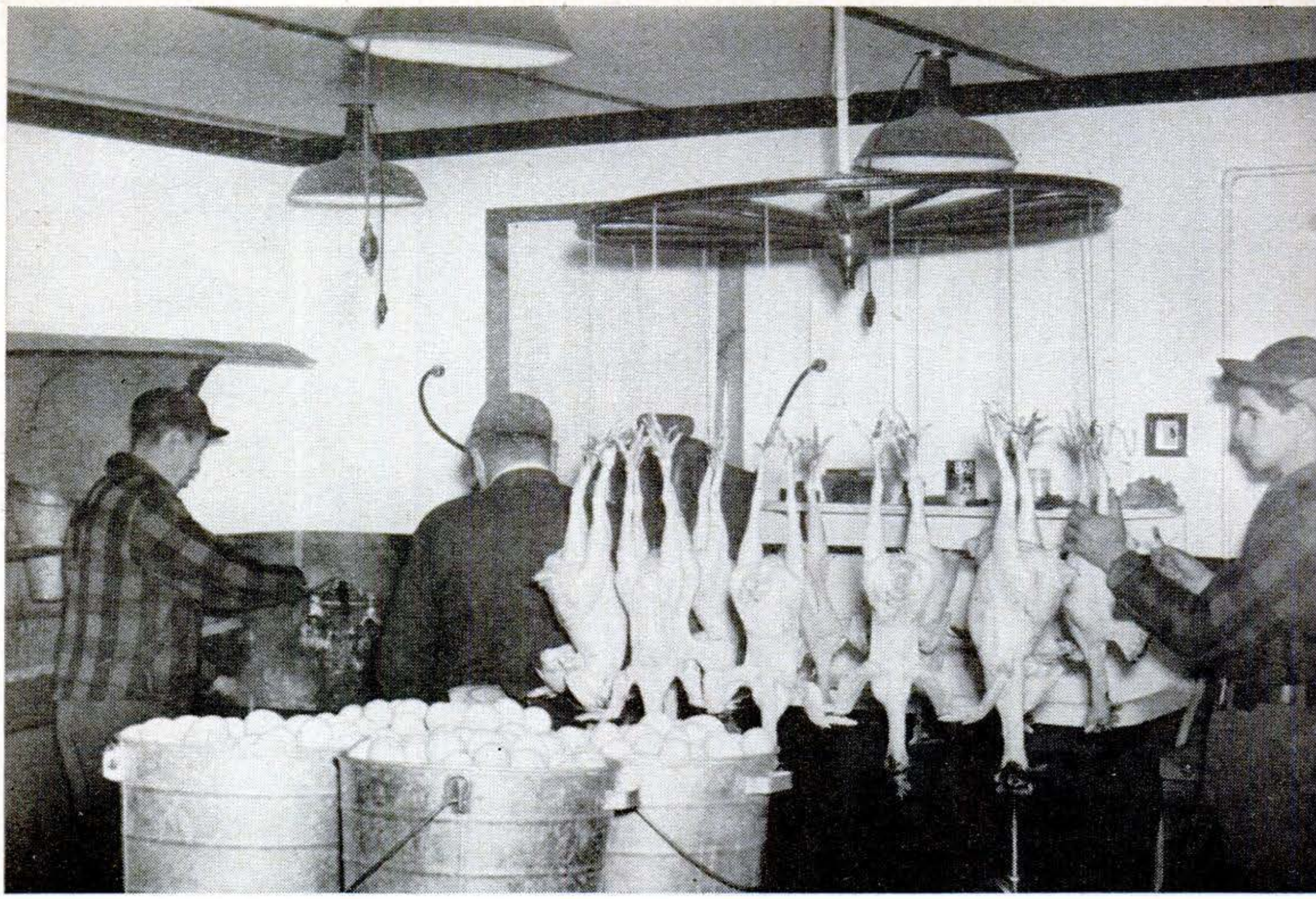
How Raindrop Really Looks

WHEN you're caught in a shower, do you picture yourself getting splashed by tear-shaped raindrops like those sketched at left? Contrary to popular belief, raindrops are not tear-shaped—nor would tears be, if they fell far. For a good look at a raindrop, General Electric scientists released water from a medicine dropper into a rising air stream that carried a drop, "falling" naturally in air, slowly upward past a high-speed multiple-exposure camera. Its pictures show that small raindrops actually are shaped like marbles or footballs. Large drops may resemble buttons, dumbbells, pancakes, gourds, telephone sets, or disk-shaped, "flying saucers." Oscillations change the shape up to 50 times a second.



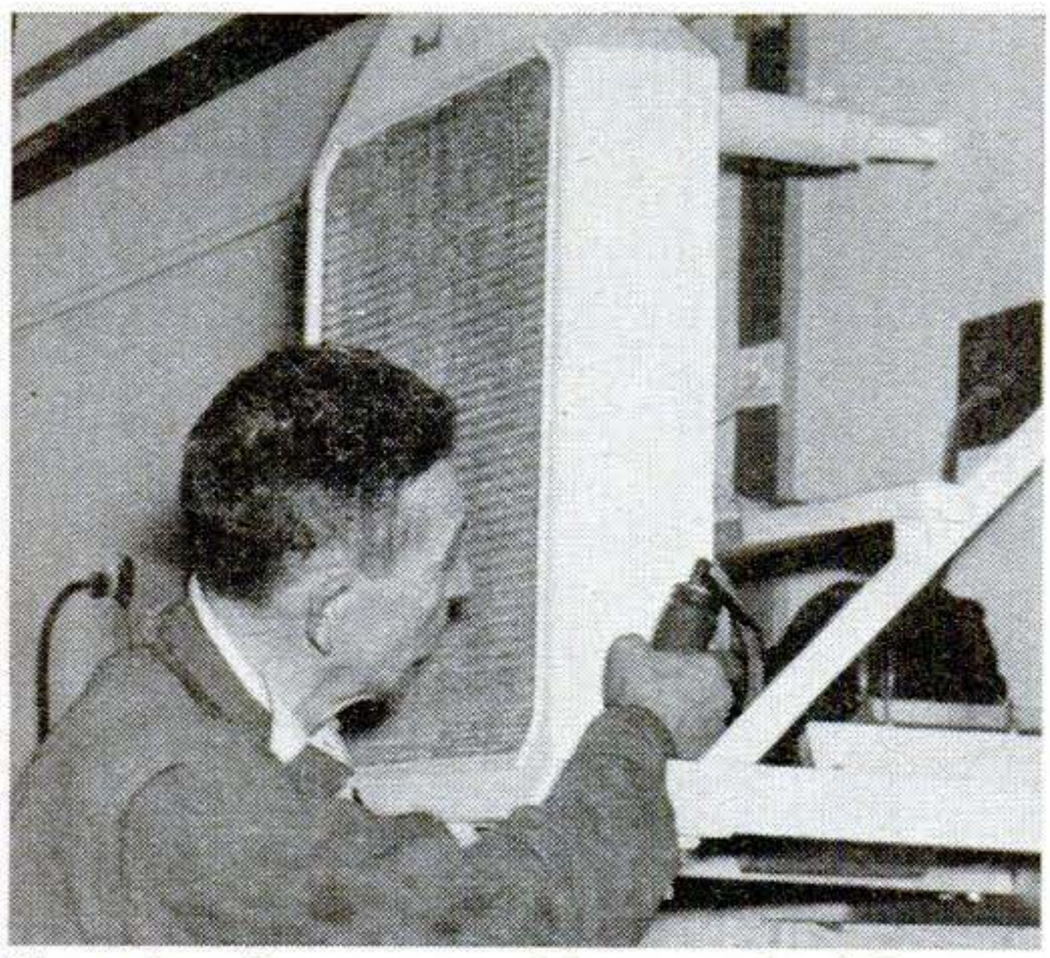
Drop of water from medicine dropper, released in rising air stream, is carried slowly upward (arrow) as camera records its changing shape. The air moving upward past the drop produces the same effect in a few inches as if the drop had fallen a long distance through the air.

Copyrighted material



General view of Charley Nassivera's assembly line shows latest in poultry farming. Charley, left, dunks a bird in automatic scalder. Brother Leon runs mechanical picker. Son Charles is singeing. Dunker, singeing wheel, and mechanical egg cooler in foreground are all homemade.

Homemade Gadgets Mechanize Chicken Farm



To solve heating problem in fowl-dressing room, Charley installed auto radiator to circulate hot water from another part of building. Motor drives old Chevrolet water pump and fan.

THEY laughed when Charley Nassivera began monkeying with worn-out clocks, discarded automobile radiators, and spare wagon wheels to mechanize his chicken farm. But Charley has the last laugh.

Charley, who lives near Glens Falls, N. Y., got plumb tired of all the work that it took to scald a chicken, pick it, and singe it to get it ready for the consumer. So he put his chickens on an assembly line.

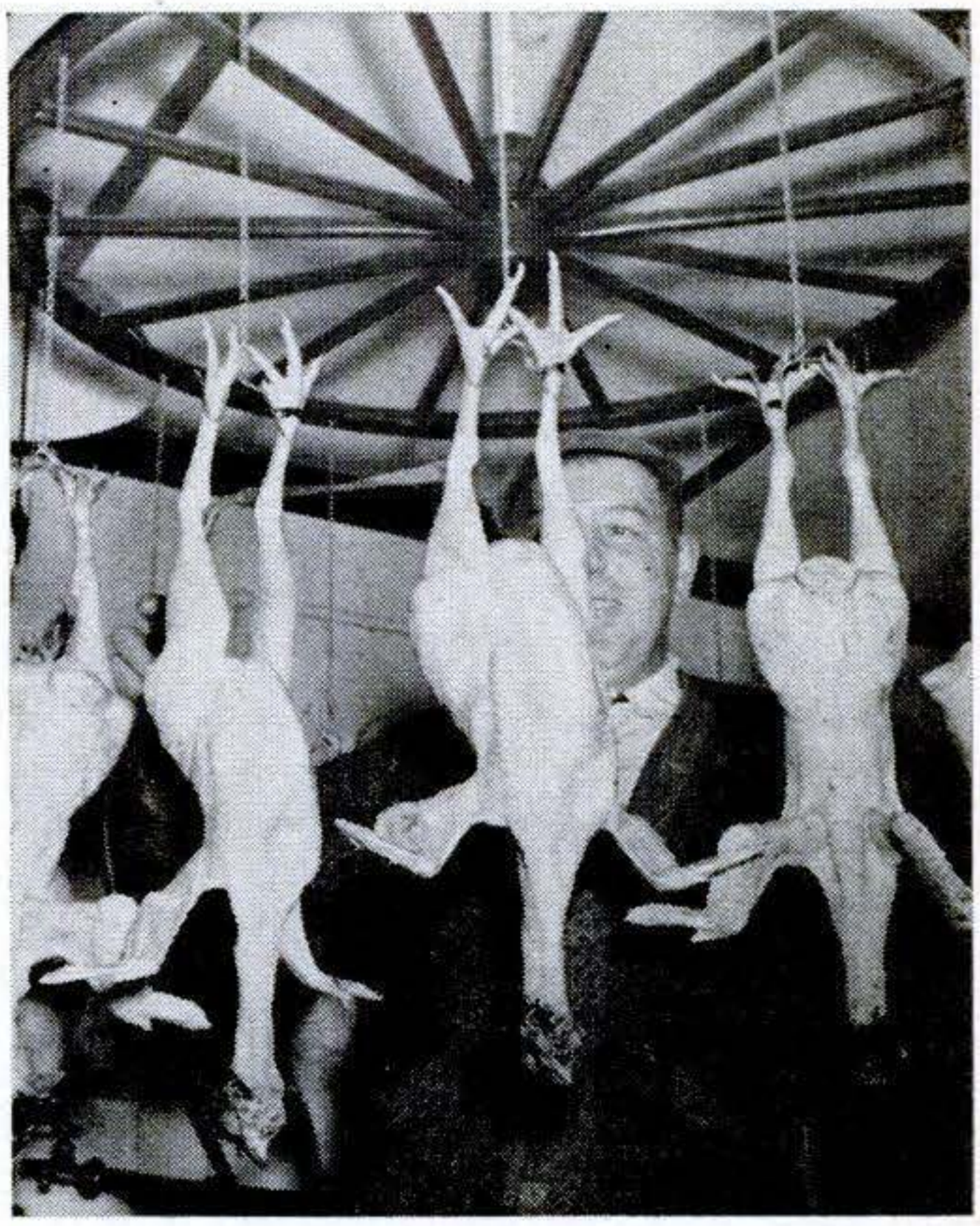
Take his scalder, now. He calls it the dunker. It was assembled from parts of a washtub, a lawn sprinkler, a doorstop, and a rebuilt motor. That motor is just one of 42 on his farm that keep production humming.

Charley has the last laugh because his Coblenol Farm has been top-rated by a big university's efficiency experts. And with his labor-saving devices he makes more money and produces better chickens and eggs.

Copyrighted material

In Nassivera's automatic scalder, agitator arm gives a bird an elliptical up-down motion. Two electric heating units, thermostatically controlled, keep the water at an ideal 128° F. to loosen the feathers. Labor-saving devices have cut cost of dressing a bird from 45¢ to 7¢.

Mechanical picker has rubber fingers to take off feathers, eliminating drudgery of hand-plucking. It's the only "store-boughten" gimmick of all fancy devices on Nassivera's farm.

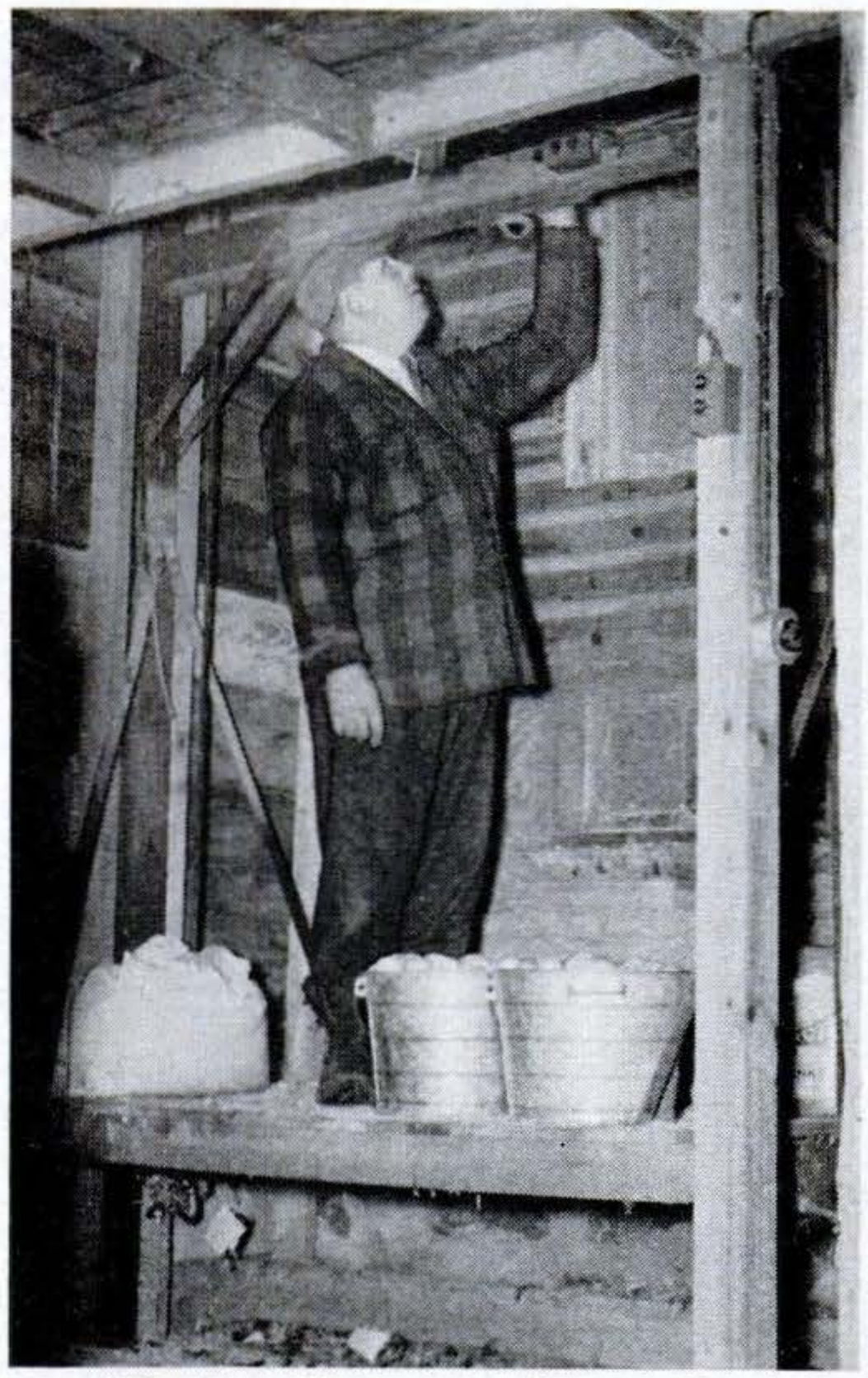


Buggy wheel, with hooks for 14 fowl, simplifies singeing. Coblenol Farm even makes day-old chicks—of special New Hampshire strain—count themselves as they are boxed.

Copyrighted material

Time-consuming chore of watering chickens is eliminated by automatic, non-freezing, self-draining system. Flow is regulated by float-arm valve. Water is warmed to induce hens to drink more, produce more eggs. At right, close-up of watering invention shows the heating coil.

To cool eggs without harmful drying, Charley shoots moist air into cabinet through old insecticide gun. Fan is in revolving drum set partly in water. Clock from electric range is timer.

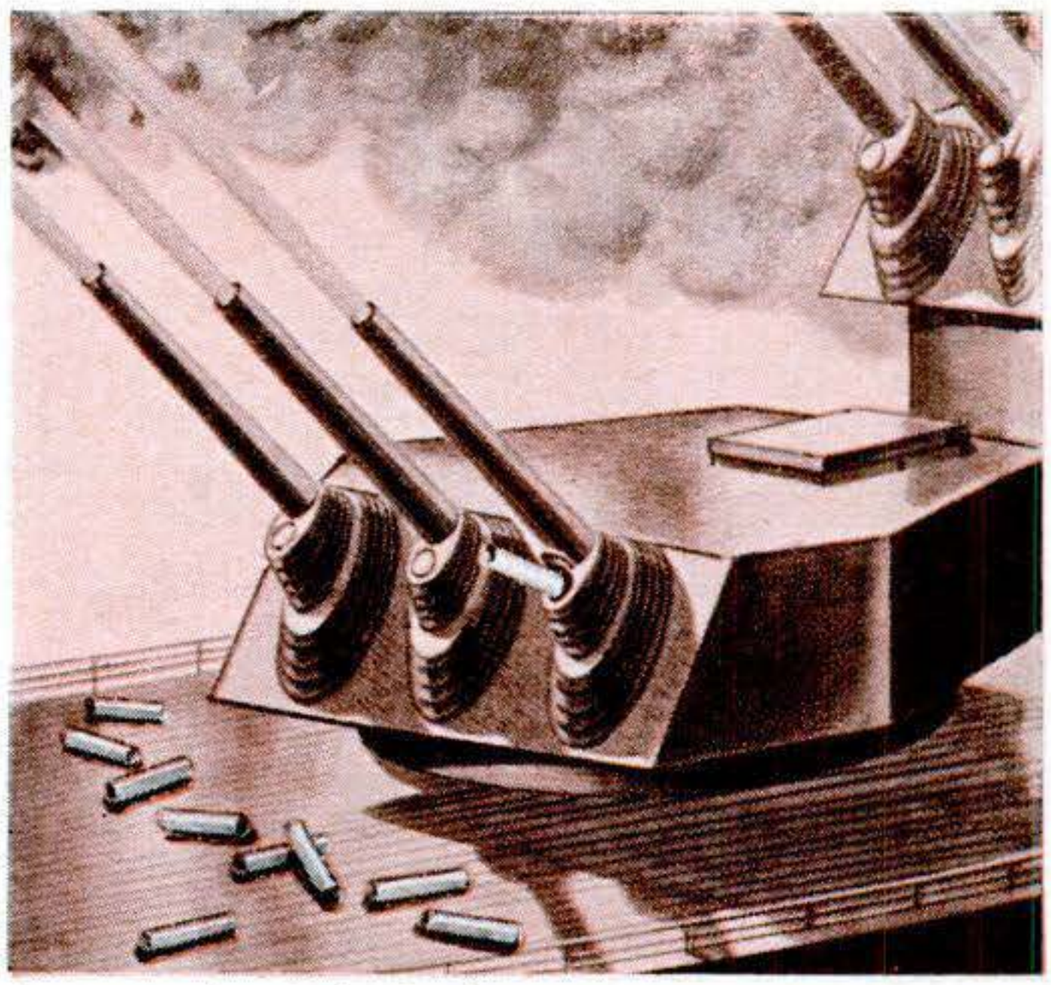


Leon Nassivera brings eggs down in four-story hen house, using brother's homemade elevator. Run by 3-hp. motor, it rides on half-inch steel cable wound on drums from rear end of a Willys.

Copyrighted material

Pride of U. S. Navy, new 17,000-ton cruiser *Des Moines* is manned by more than 1,000 officers and men, betters 30 knots, and mounts nine automatic eight-inch guns, 12 five-inchers, and 20 three-inchers, plus 12 20-mm. machine guns. Twin catapults launch four seaplanes.

New Cruiser Packs 8-Inch Automatics

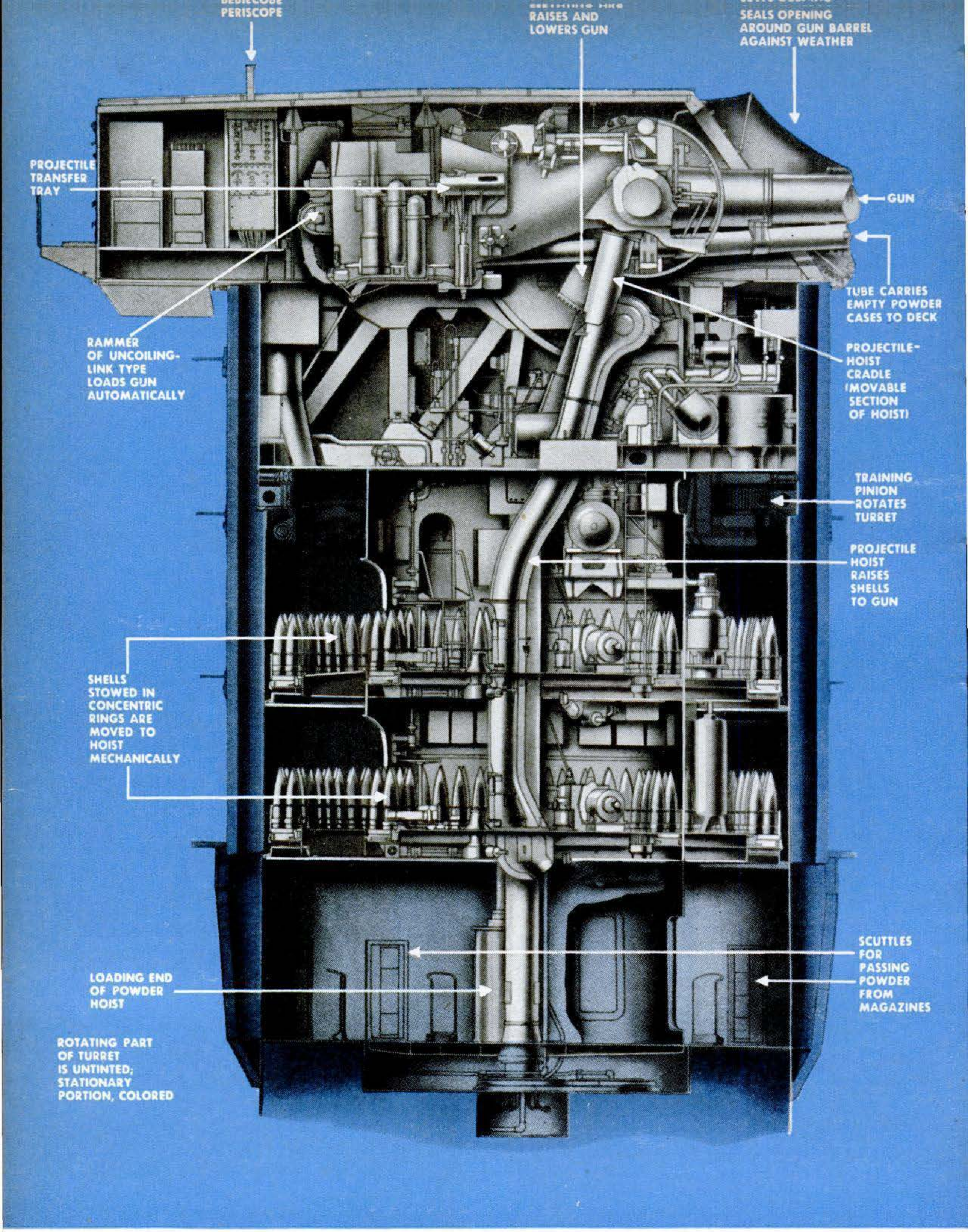


Automatic eight-inch gun turret in action is visualized by artist. New guns use powder in brass cases, instead of silk or nylon bags, and empty cases are ejected onto deck as shown.

AUTOMATIC eight-inch guns, first of this large caliber to be perfected, quadruple the fire power of the U.S. Navy's new 17,000-ton cruisers. They make the U.S.S. *Des Moines,* completed last November, and her sister ships *Salem* and *Newport News,* due to join the fleet this spring, the most powerful warships of their class afloat. Outweighing battleships of only four decades ago, these heaviest of our "heavy" cruisers each mount a main battery of nine of the automatic eight-inchers, six in two triple turrets forward and three in one turret aft.

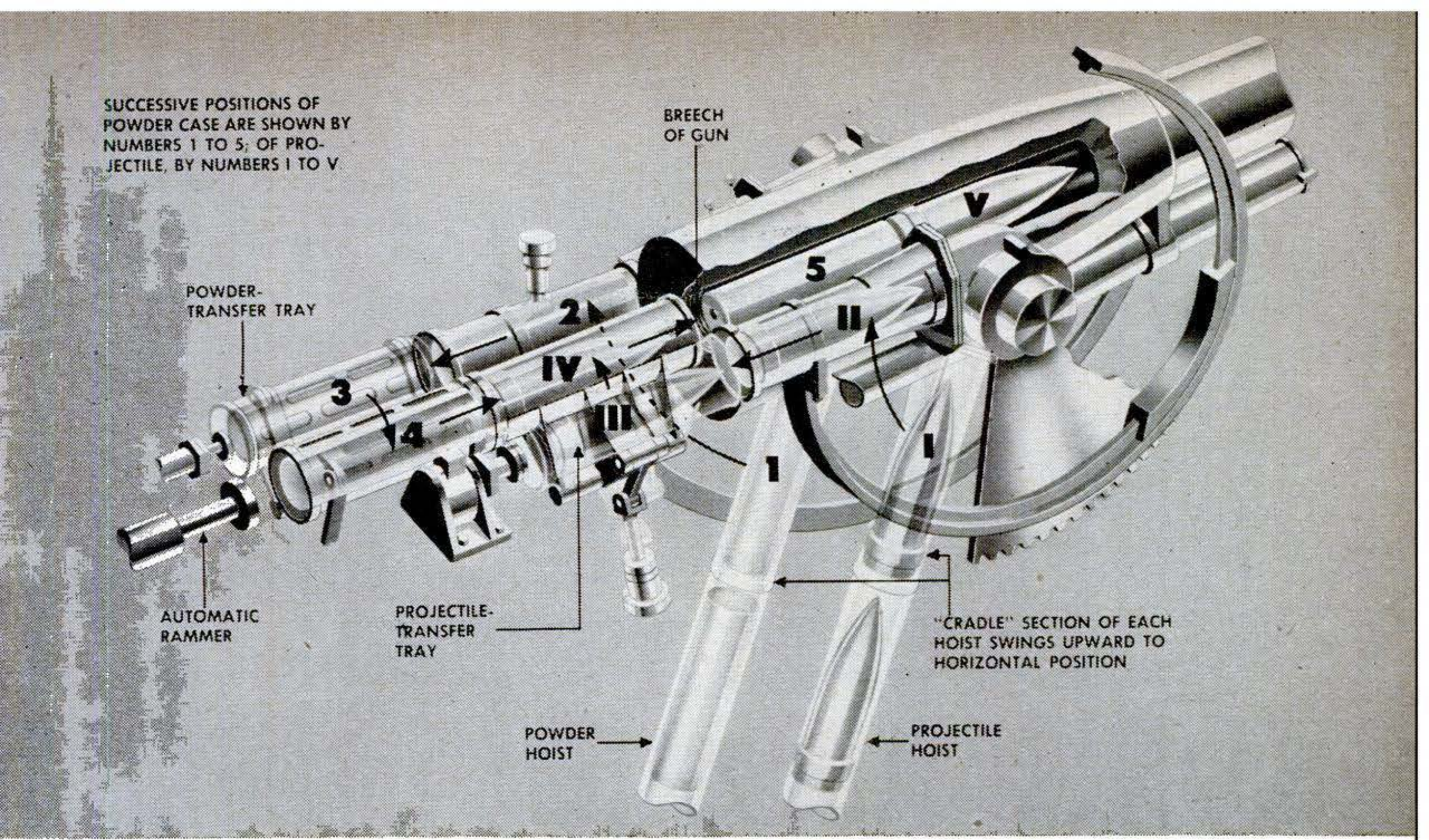
Transferring powder bags and shells from hoists to gun by hand, formerly a task of sweating turret crews, has been eliminated. Ingenious mechanisms designed by Bureau of Ordnance engineers make the big rifles fully self-acting from ammunition-handling rooms to gun muzzle. Consequently, the Navy says, they fire at least four times as fast as any gun of their size used before. Since a good hand-loading crew can pump out about two rounds a minute, that would

Copyrighted material



Cross section of automatic eight-inch gun turret on new cruisers shows how projectiles, stored in concentric rings below deck, are fed to gun by tubular power hoist. Similar hoist, on far side, raises powder in brass cases from magazines. Part of mechanism that transfers shell from hoist to gun is seen at top. Each turret contains three guns like the one shown.

Copyrighted material



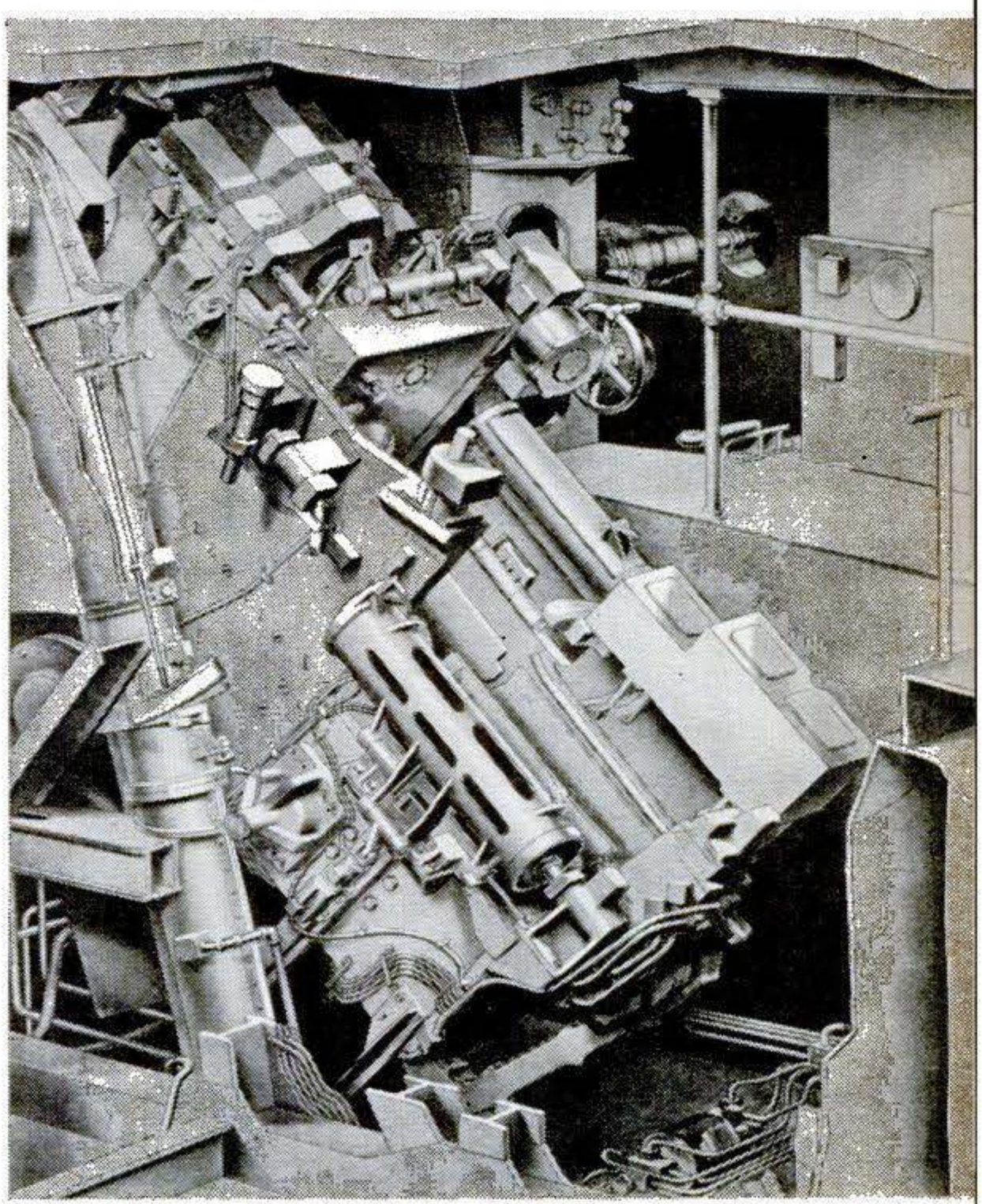
Simplified diagram shows how automatic mechanism of new turrets replaces slow and laborious hand transfer of shells and powder from hoists to guns. This multiplies normal rate of fire of eight-inch guns at least four times. Each gun has its own pair of hoists.

mean that one of the new cruisers could throw a broadside of nine 334-pound, armor-piercing shells at least eight times a minute, or once every 7½ seconds.

How the rapid-fire big guns work can now be revealed, with U. S. Navy sanction. One of their secrets is substitution of brass powder cases for powder bags of silk or nylon. Synchronized with the rate of fire, tubular power hoists raise powder cases and projectiles from deep in the ship.

At the top of its hoist a powder case enters a movable section that serves as a cradle, compressing a spring as it does so. The cradle then swings in an upward arc to gun position. Here a trigger trips the spring, and the powder case is ejected rearward into a transfer tray, which swings on a pivot to bring it into line with the bore of the gun. Simultaneously, a similar mechanism swings a shell into place just ahead of it. An automatic rammer shoves both into the gun, the breechblock slams shut, and the gun fires. As it recoils, the empty powder case is extracted, and ejected by a chain-driven conveyer to the deck outside.

Unlike former types, these guns reload at any angle of elevation. They fire singly or in salvo, and may be used against either ships or aircraft. END



Official Navy drawing gives close-up, cutaway view of new automatic eight-inch gun from within turret. Tube at left is the powder hoist, and slotted cylinder is powder-transfer tray.

Copyrighted material

So A-Bombs Aren't So Bad?

Two debunking books have started a lively and important argument in scientific and military circles.

P. M. S. BLACKETT, a Nobel prize winner in physics, thinks Americans have exaggerated the A-bomb's importance. R. E. Lapp, a Manhattan Project physicist, fears that people are hiding from the facts. Prof. Blackett defends the Russians' attitude toward the bomb; Dr. Lapp is mainly concerned about America's security. Prof. Blackett's book, *Fear, War, and the Bomb,* started a hot and important argument among scientists and military authorities, which now has been intensified by Dr. Lapp's new book, *Must We Hide?*

Both men base their contentions largely on reports of the United States Strategic Bombing Survey (USSBS). Volta Torrey, PS managing editor, helped prepare part of those reports. Here are some of Blackett's and Lapp's most interesting opinions, followed by Torrey's explanations, comments, and questions:

BLACKETT SAYS: "One improved atomic bomb can be considered as the equivalent of about 3,000 tons of ordinary bombs."

LAPP SAYS: "The problem of atomic defense is a great one, but it is not hopelessly great."

Blackett's figure (3,000 tons) is based on a comparison of the A-bomb's effectiveness against brick walls at Nagasaki with that of a blockbuster. Comparing the number of buildings actually destroyed or damaged previously by other bombs with the number wrecked by the A-bomb shows the latter was closer to an equivalent of 15,000 tons of ordinary bombs. And comparing the number of people killed by other bombs in Japan with the number killed by two A-bombs shows that each A-bomb was as lethal as about 40,000 tons of the other bombs.

But all such comparisons are tricky. A-bombs differ from blockbusters the way X-ray machines differ from firecrackers. How many firecrackers would you need to X-ray a tooth?

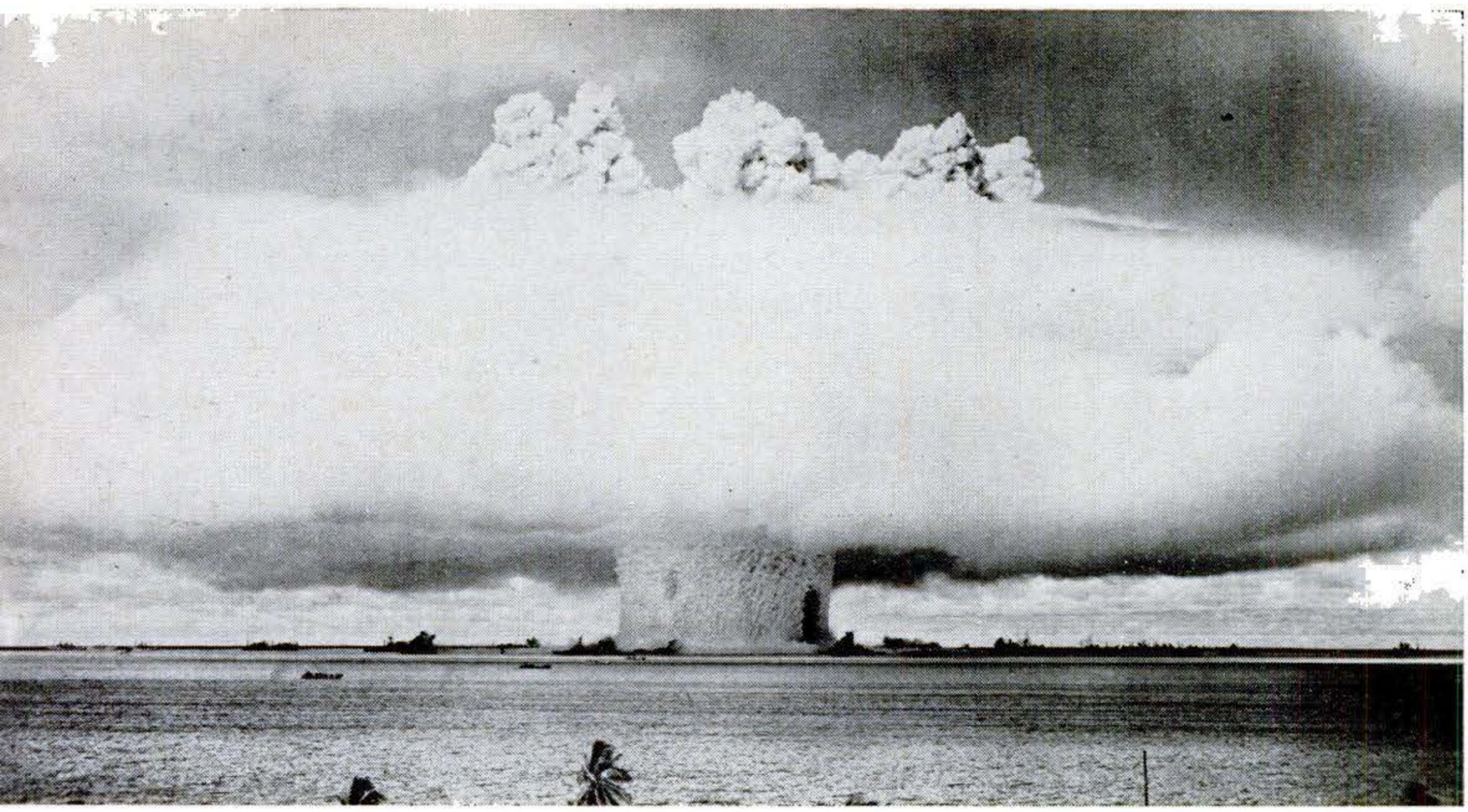
Lapp points out that people can be shielded from the A-bomb's radiation, and argues that more victims could be saved than were in Japan, but admits that no one has enough genetic information yet to be sure about the radiation's effects on future generations.

BLACKETT SAYS: "Some 400 improved atomic bombs would be required to do what 1,300,000 tons of ordinary bombs did in Germany.

LAPP SAYS: "After absorbing 75 A-bombs, Germany would not have been a very productive nation."

The USSBS found that air raids on cities and light attacks on industries in the first part of the war were disappointing, but that the heavy attacks on German oil and transportation targets were decisive. Knocking

Copyrighted material



out a small number of oil plants deprived the Germans of fuel for their planes and panzers. This enabled the Allies to control the air and shove back the blitzkriegers.

These findings show that 400 A-bombs could be wasted against a nation such as Germany, but a small number of A-bombs in the right places could be decisive.

BLACKETT SAYS: "The number of atomic bombs required to produce decisive military results will increase with the area and population of the country under attack."

LAPP SAYS: "Because so many bombers may be able to penetrate our defense net, it is most important that we consider every possible measure which may reduce the effectiveness of the bombs that are delivered."

An elephant is bigger than a mouse but can be killed with one bullet. Do not nations, too, have nerve centers, regardless of their size? The U. S. has about 40 cities as big or bigger than Nagasaki. Russia has about the same number. How many of those cities could either nation spare?

Lapp urges that American cities be spread out more. The Russians have more space in which to spread out. But a bomber can now reach any point on the earth's surface. No conceivable wall of radar, fighters, guided missiles, and guns would intercept every bomber if enough planes were assigned to a target. Against an A-bomber that reaches its target only two defenses are possible: hiding and hitting back. Both would be risky.

BLACKETT SAYS: "Repeated deep penetration of a heavily defended territory is likely to be an expensive operation."

LAPP SAYS: "The atom bomb has not made war cheap."

Both authors are right. Fewer penetrations would be necessary with A-bombs than with other bombs. But A-bombs are expensive. So are delivery planes. So, too, are defenses.

BLACKETT SAYS: "The power of human beings to 'take it' is immense; a determined people will learn to stand atomic bombardment."

LAPP SAYS: "Could not an initial air blitz of Russia succeed in breaking the will of the people to resist? . . . No one really knows."

Submarine crews and men for other hazardous duties are chosen carefully, then specially trained. Some people can "take" almost anything. Others simply can't. So some people undoubtedly could learn to stand atomic bombing. But how many?

Winston Churchill doubts whether the British people's reactions would have been as healthy as they were if the air raids on

Copyrighted material

Britain had been much heavier. The Germans endured heavier attacks later, but the USSBS ascribed this to "the power of a police state" over them.

Would that power—to control people's information and actions—suffice against the additional horrors of A-bombs? In Japan, every pregnant woman within about a mile and a quarter of the A-bombs whom the USSBS could find later either had a miscarriage or a premature baby who died shortly after being born. "The threat to the world if the horrors of the air-atomic combination are ever unleashed," says Gen. Carl Spaatz, "is impossible to exaggerate." No one knows how many people could endure such horrors.

BLACKETT SAYS: "The number of atomic bombs required to produce decisive results in a war between America and Russia would run into thousands."

LAPP SAYS: "A properly prepared and alerted country can absorb not a huge but a fair number of A-bombs."

Blackett's conclusion rests on his contentions that an atomic bomb is the equivalent of only 3,000 tons of T.N.T., that other bombs were not decisive in Germany, that more would be needed against a bigger country, and that people would "take" atomic punishment. But what if things happened fast?

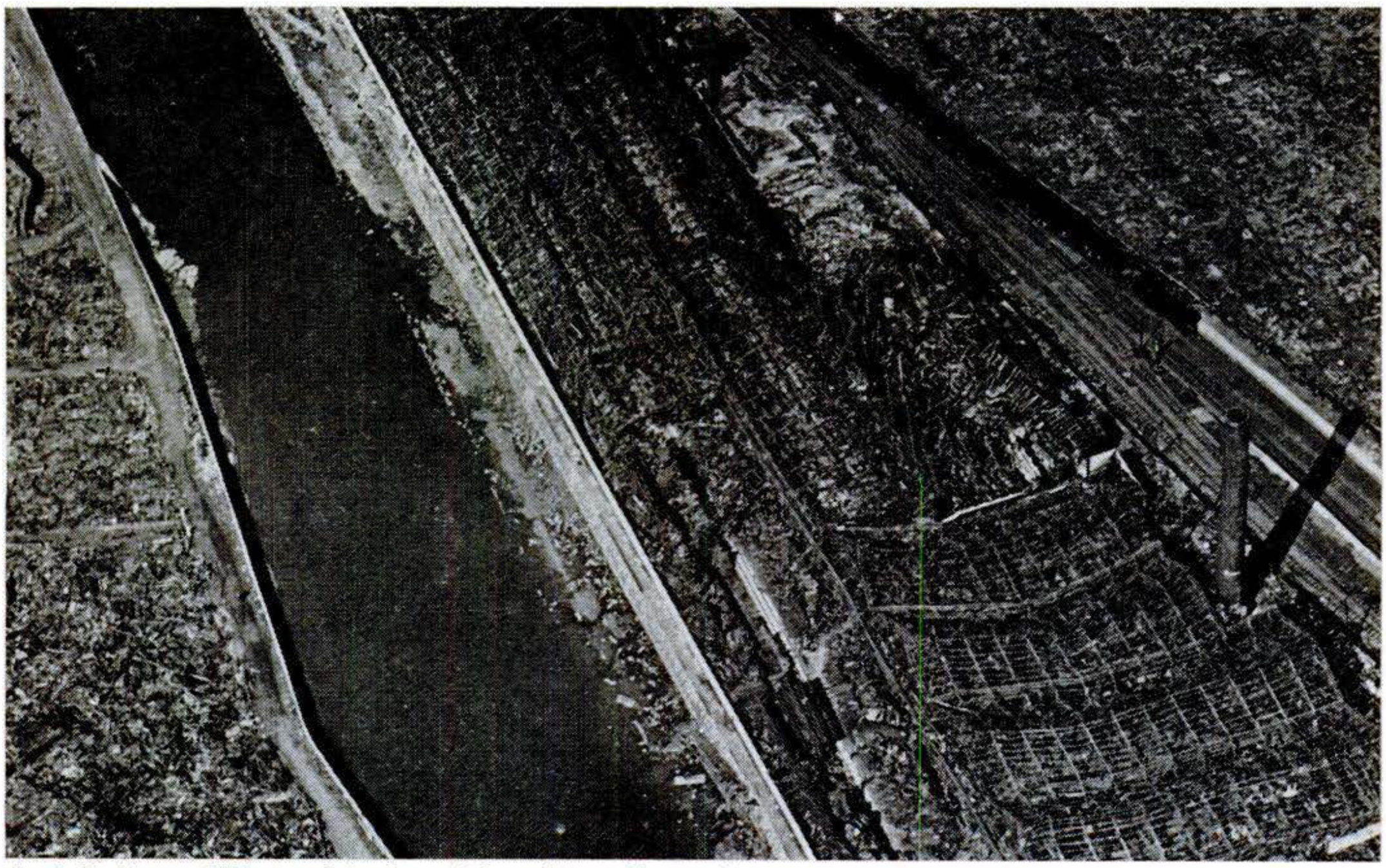
"One might as well argue," Dr. Manuel Sandoval Vallarta has written in *Physics Today*, "that because the kinetic energy of a certain rifle bullet is equivalent to ten body blows delivered by an expert boxer there is no essential difference between the effects of the bullet and the result of blows. Such reasoning is fallacious and, in the circumstances, highly dangerous."

Lapp's conclusion is based on his belief that cities can be spread out, shelters provided, and measures taken to reduce the casualties from atomic attacks.

Maj. Gen. William E. Kepner has pointed out, however, that A-bombs haven't been tried yet in every conceivable way. Suppose, he has suggested, that one bomb were detonated in water, and that another were detonated a trifle later amidst the millions of tons of contaminated water thrown high into the air by the first bomb. Might not some such tactics make even the results of the second Bikini test seem piddling? Does anyone really know how many blows of that sort even a properly prepared and alerted country could absorb?

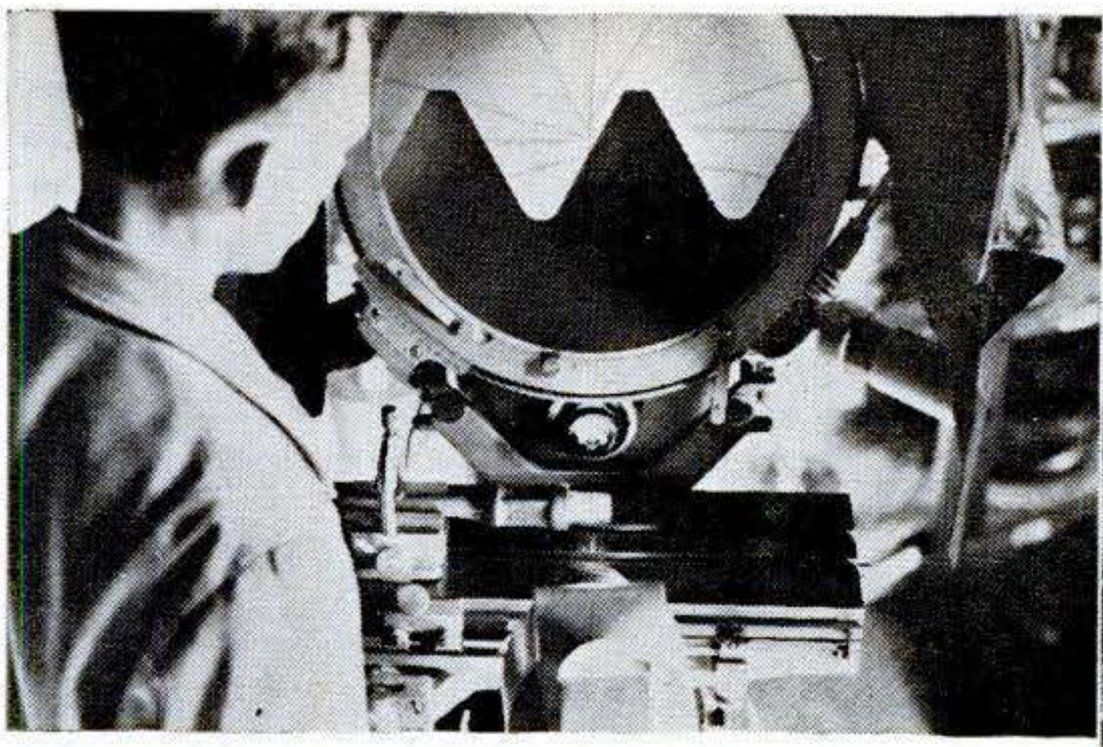
THE USSBS SAYS: "The best way to win a war is to prevent it from occurring."

END



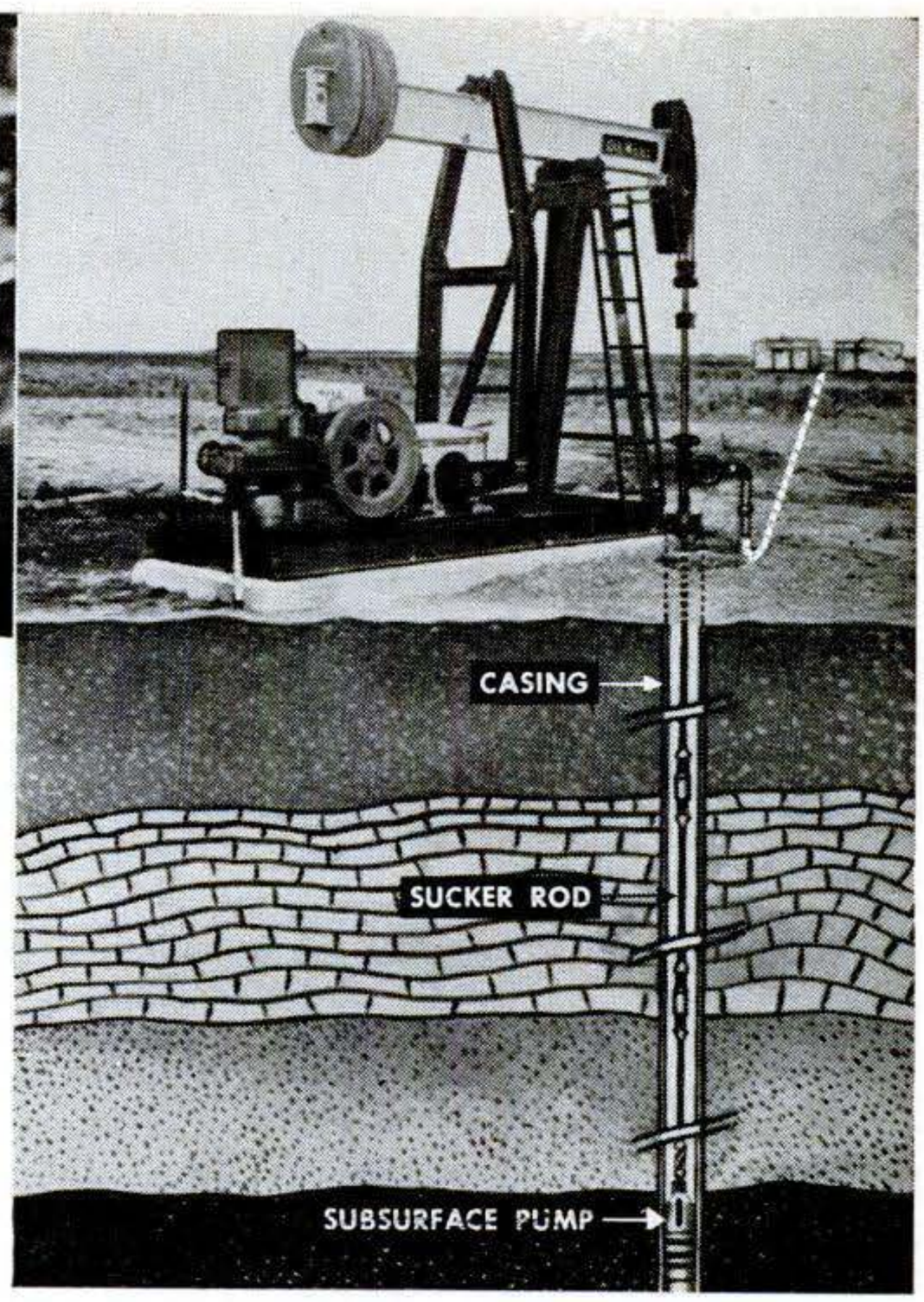
Aerial view of Nagasaki after A-bombing shows destruction two to three miles from the blast.

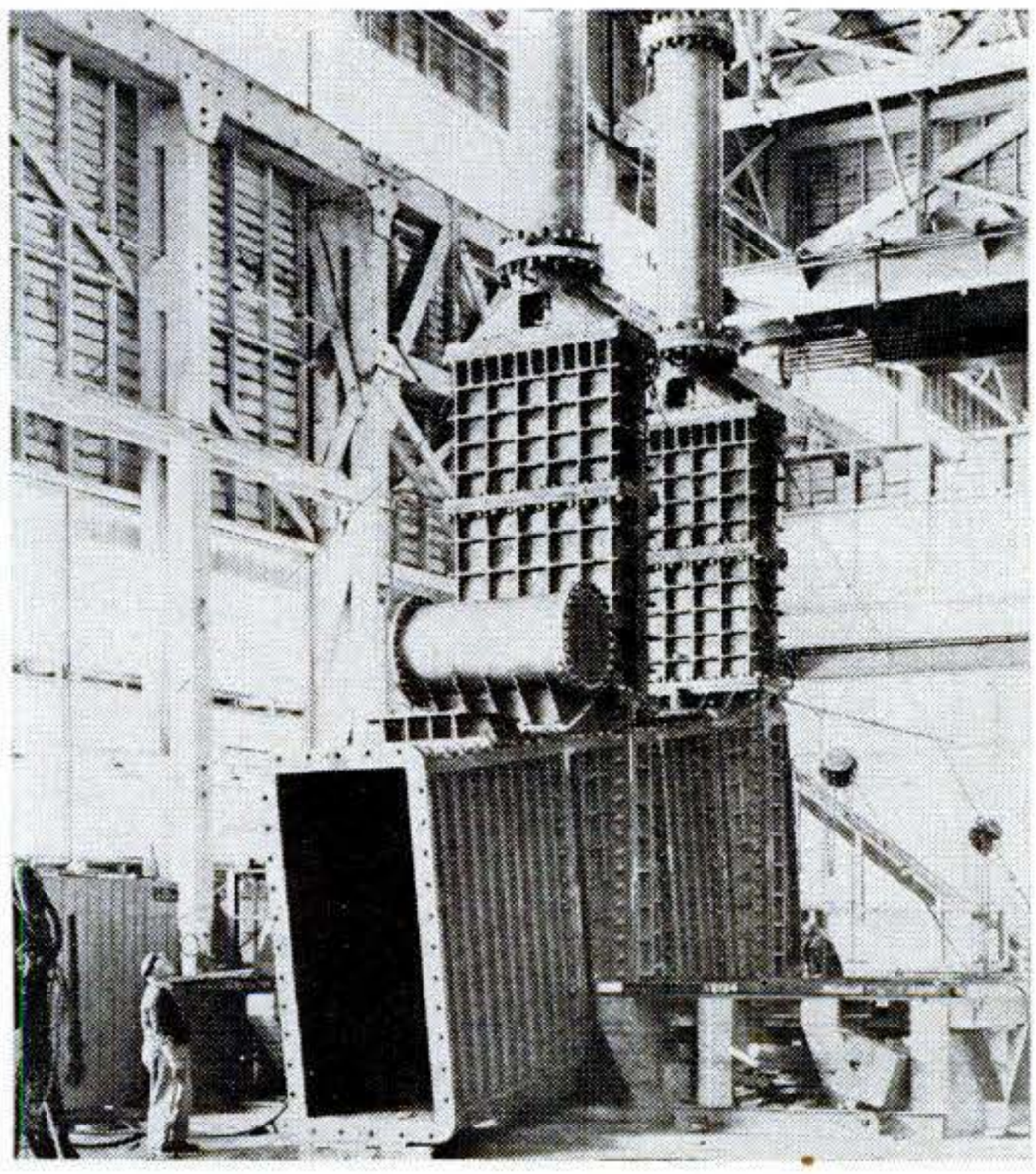
Copyrighted material



Projector Checks Threads

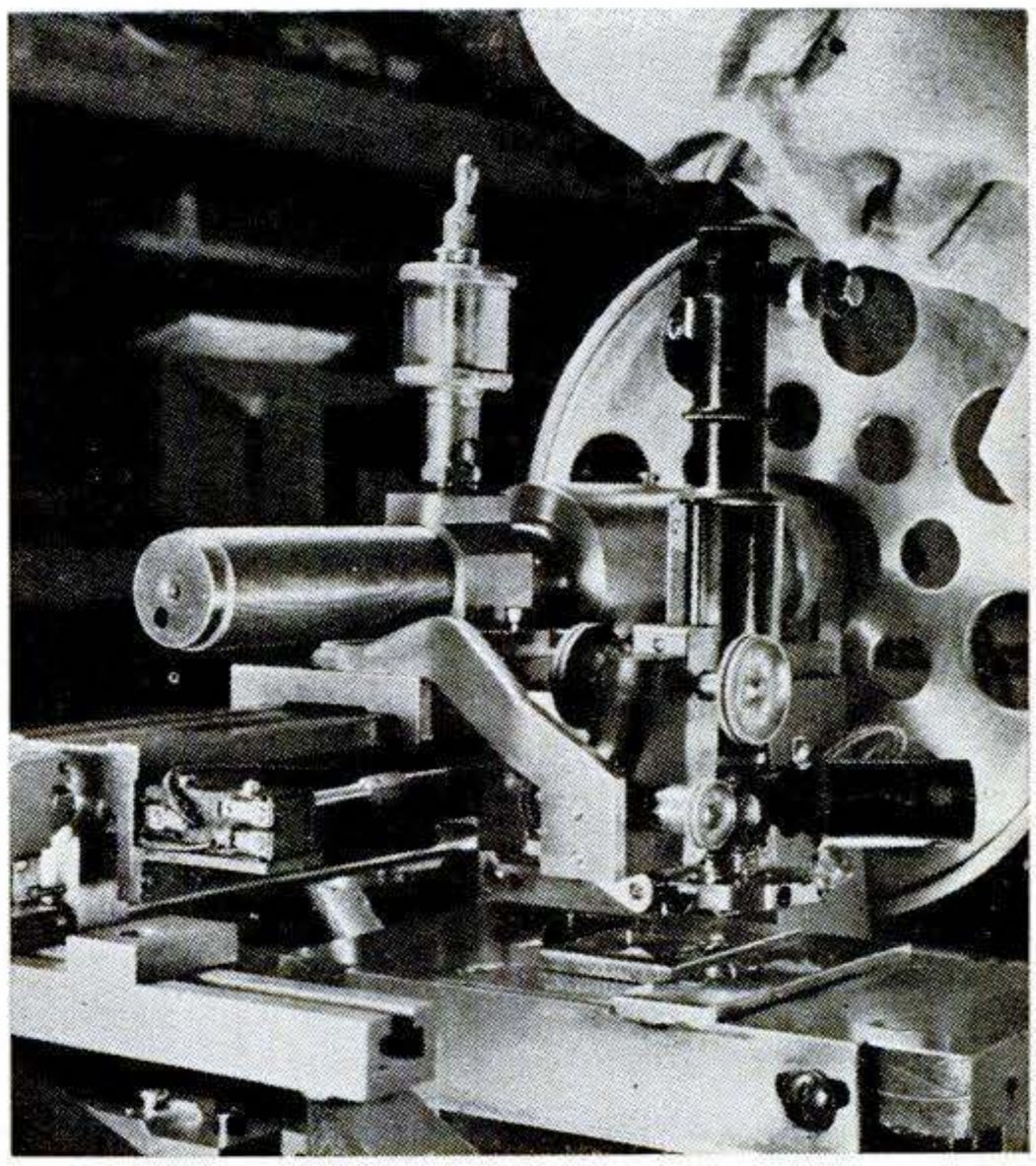
THE saw-toothed image on the circular screen above is a magnified projection of threading on a steel rod. The projector is used by U. S. Steel to spot defects that would weaken links between the sucker rods that actuate pumps at the bottom of oil wells. The cutaway view at right shows how a string of these rods connects a sub-surface pump with its engine hundreds of feet above. The slimmer the rods can be without breaking, the less they block the flow of oil.





Water Tap Weighs 100 Tons

THIS 47½-ft. structure is one of 16 slide gates that will control the flow of water through Bull Shoals Dam in Arkansas. Hydraulic pistons at the top raise and lower two five-ton gates across the 4- by 12-ft. conduit. Knocked down for shipment from the Westinghouse plant at Sunnyvale, Calif., the 100-ton unit occupied three railway flatcars.



10,000 Lines Cut to Inch

THIS machine is probably the world's finest engraving tool. Its diamond tip, guided by an operator who looks through a microscope, can scratch 10,000 lines to an inch on smooth metal. General Motors uses it to rule gold blocks that serve as comparison standards for surface finishes on bearings and other mechanical sliding parts.

Copyrighted material

Topped by his famous gray Homburg, Bill Odom shows what the well-dressed pilot wears on a record-breaking flight across an ocean and a continent. The plane is a Beechcraft Bonanza®.

How to Hop

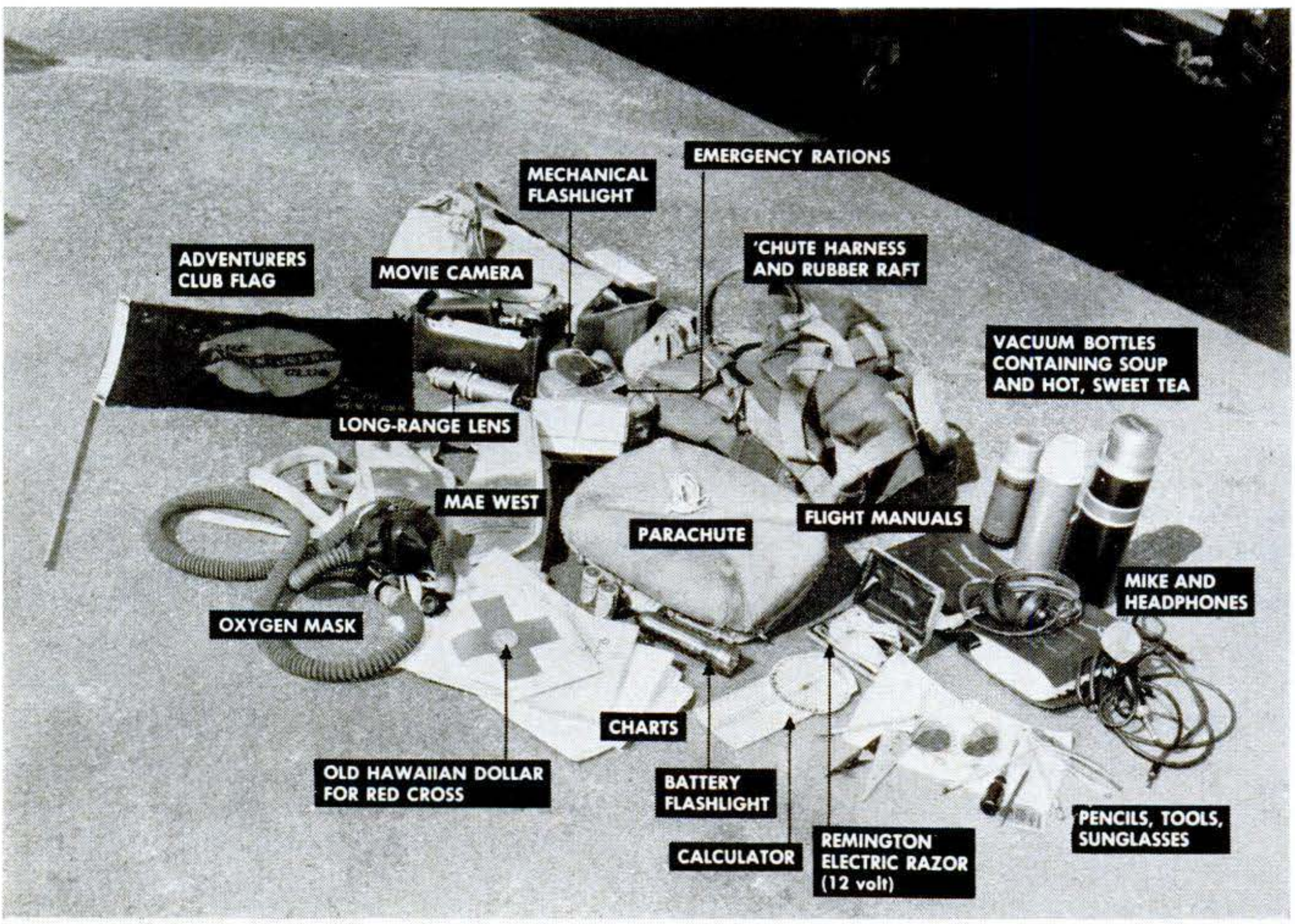
By Herbert Johansen

YOUR plane is a small, light, single-engine job—like the Beechcraft Bonanza® Bill Odom recently flew 5,300 miles nonstop from Hawaii to Teterboro, N. J., across the Hudson from New York City.

It's nice to have a sponsor, but be sure to check your bank balance to see that it will stand a nick of $90 for gas and oil.

It also helps if you can supervise the construction of the 185-hp., six-cylinder Continental engine as Odom did. It gives you added confidence in the compact power package that must keep you flying for 36 hours over ocean, mountains, and plains.

Patience is as necessary as extra gasoline and special flight instruments. Flying conditions must be just right. So you wait, day after day, haunting the weather office. While waiting, you supervise the assembly of your plane, and get plenty of rest, going to bed



It took a lot of planning and elimination to get the accessory equipment down to a minimum. About the only concession to personal comfort is the electric razor that plugs into the plane's cigarette lighter. Life raft and emergency rations are attached to 'chute in center.

Copyrighted material

5,000 Miles Nonstop

at 8:30 and sleeping until 9 a.m. Then, one day, comes the phone call from the weatherman. This is it. You rush to the airfield.

Your gasoline already has been chilled by a steel tube filled with dry ice inserted in the fuel truck. In six hours it has brought the temperature down from 80° to 20° F., shrinking it so that you can squeeze in 12 extra gallons—and, boy, how you are going to need them. With 288 gallons in wingtip and cabin tanks you take off. Out over the Pacific you're grateful for the one-man life raft and emergency rations—just in case.

In taking off you use full engine power because the plane carries a 50 percent overload; but at about 5,000 feet you throttle her down, using from 80 to 115 hp., depending on winds and weather. In the same way, you regulate your speed, from a maximum of 124-m.p.h. indicated air speed to a minimum of 110 m.p.h. It has all been figured to stretch that limited gas supply.

What with flying the plane, working the radio, and navigating, you're pretty busy. But you find time to eat—chicken sandwiches, chocolate, and bouillon. You drink orange juice, hot tea, and water—a diet calculated to keep you awake and alert.

About 450 miles out of San Francisco you're met by a PBM flying boat that escorts you to the California coast. You've made the mainland, and head north for Cheyenne. Bad weather, icing and snow, force you up to 16,000 feet and oxygen. But you get through and slide down the home stretch. Across the Midwest, your second dawn greets you over the Mississippi. Gas is holding out, but you feed it sparingly into that faithful, humming engine. Before you know it, there is the Hudson River—New York—and so you've more than doubled the world's light-plane record. That's how Odom did it—with 15 gallons, 3 quarts, and 1 ounce of gas left. END

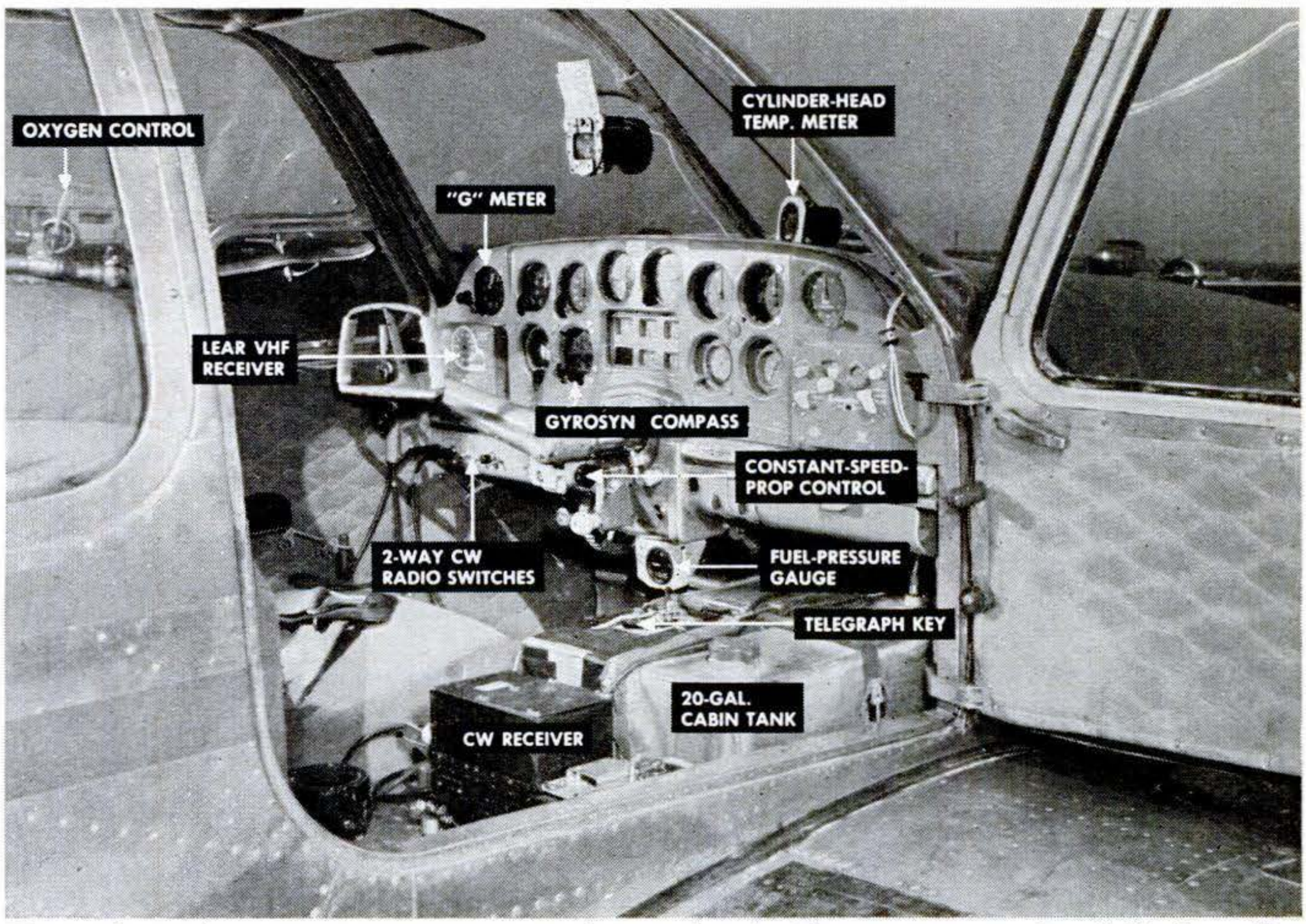


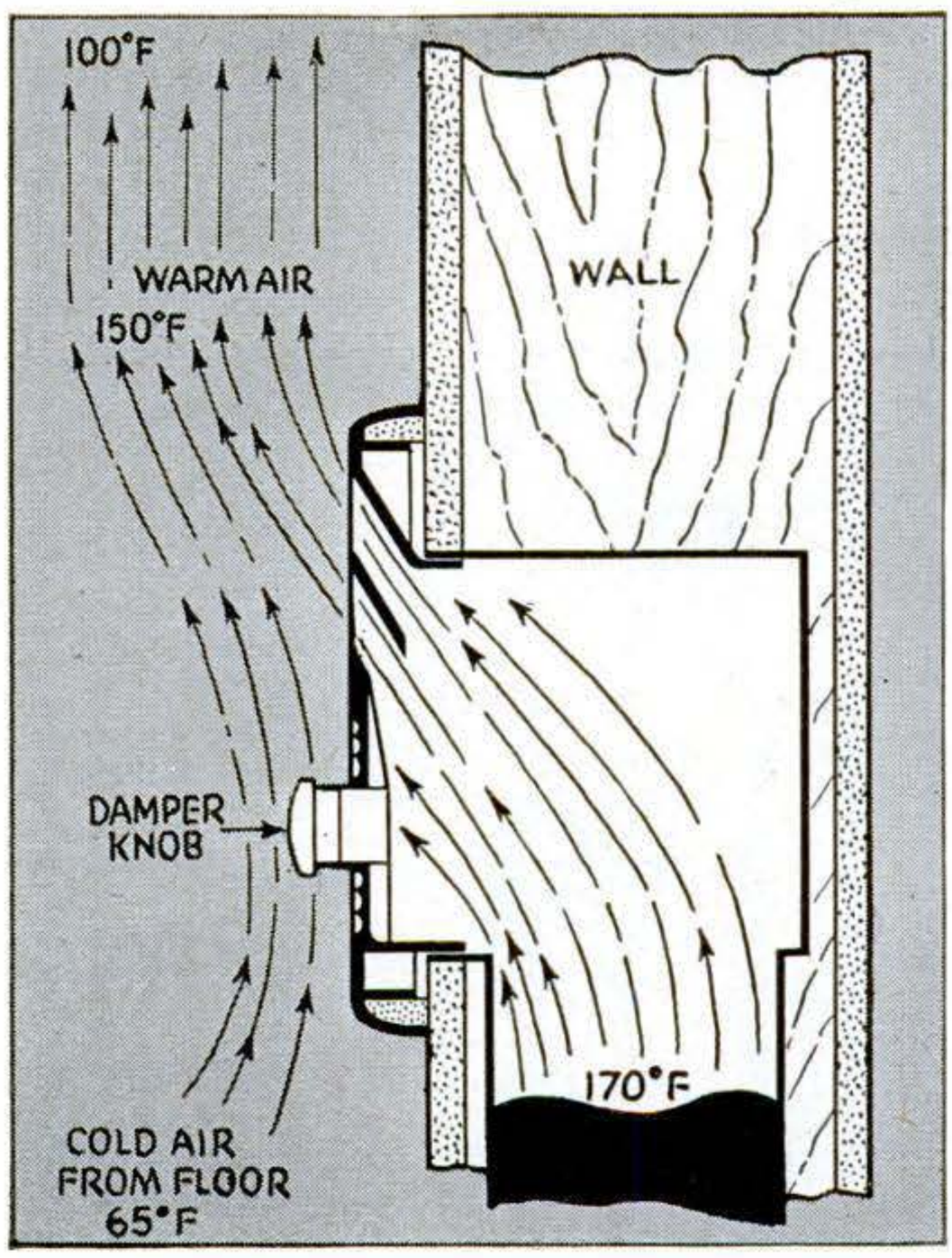
Photo above shows extra equipment carried in Odom's plane, the *Waikiki Beech*. Craft is four-place plane, but rear seats have been replaced with reserve gas tanks. Aside from this, and two 62-gal. wingtip tanks, plane is standard model. *PS photos by Hubert Luckett.*

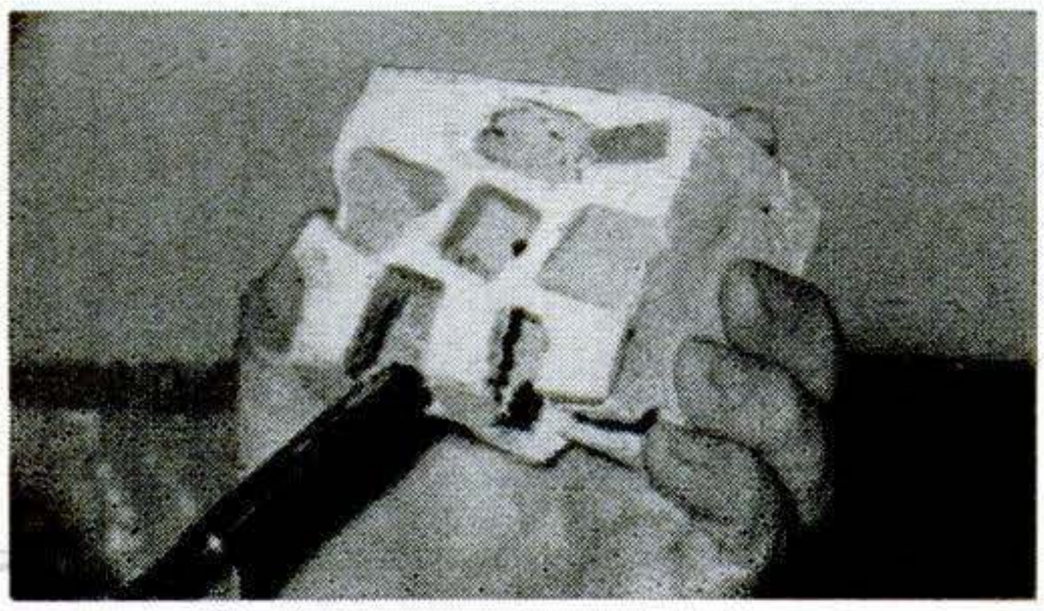
Copyrighted material

New Unit Heats Homes Better for Less Money

WITH smart design and unconventional materials, General Electric engineers have turned out a new heating plant that provides more uniform, draft-free warmth at lower cost than old-style systems. A complete hot-air system, it uses 4-in. stovepipe that fits between the inner and outer walls instead of the more expensive rectangular ducts that require special cutting. The plenum chamber (above, right) has scored sections easily punched out for connections at any point. These short-cuts, says GE, reduce installation costs up to 50 percent.

The new unit supplies air at slightly higher temperature and much higher velocity than existing systems. A specially designed register (right) shoots this hot, fast air up so that it fans over the wall, warming the cold plaster to give even heating as in radiant systems. No air flow can be felt beyond a few inches from the wall, so furniture can be placed in front of the register itself. The package heating system is designed for use with oil or gas furnaces.





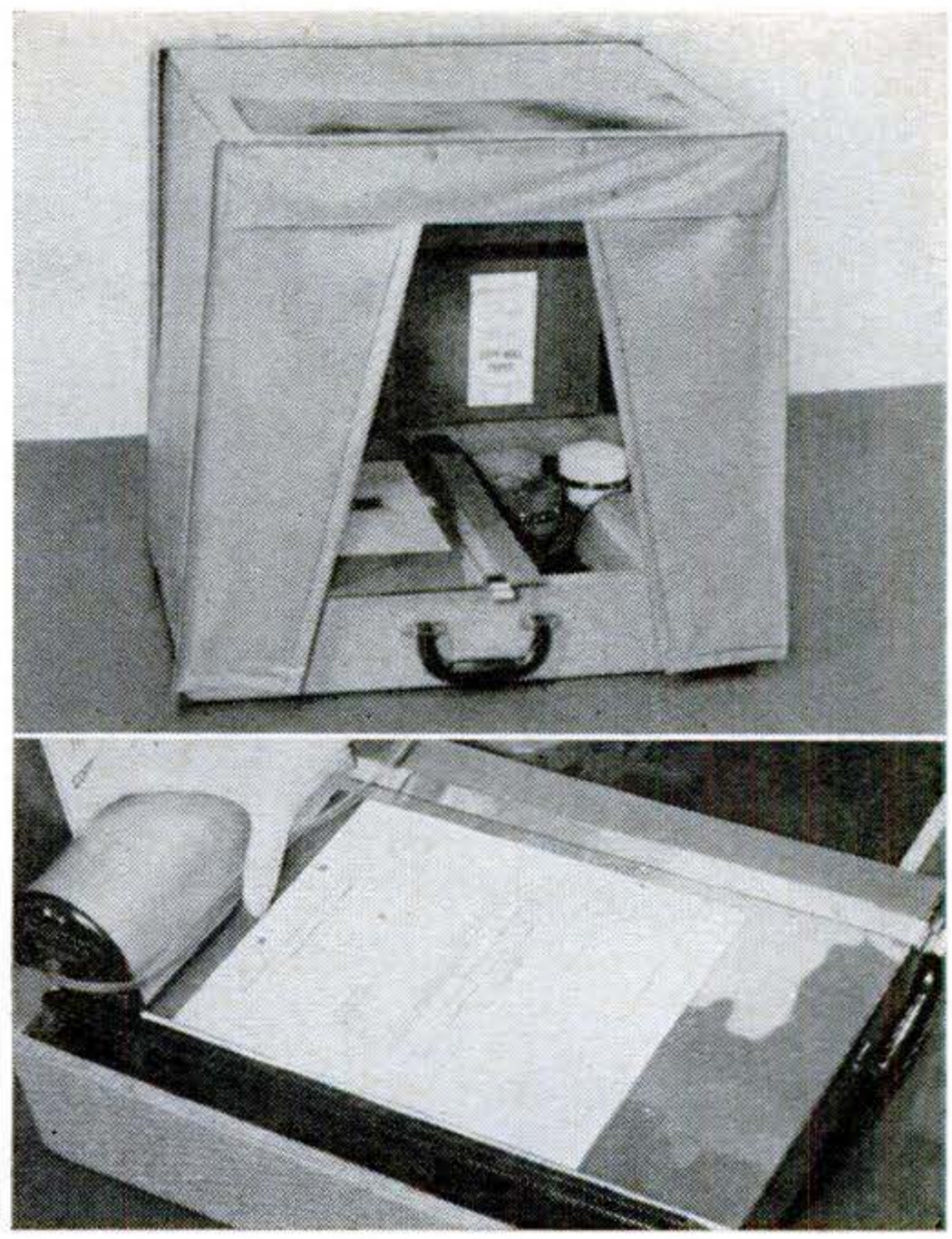
Ice Improves Concrete Block

ICE makes a new kind of concrete block lighter, yet stronger. The ice, mixed with the concrete, melts after the blocks are cast, leaving vacuum cavities (left) that add strength, cut weight, and increase insulation. The water from the melting ice is absorbed by the concrete, prolonging its drying time and so making it harder. W. R. Twiford, Miami, Fla., developed the process.

Copyrighted material

Robot Takes Phone Messages

IF YOU'RE away when your phone rings, this device will take the message by recording it on magnetic wire. At the second ring, it plays a record saying you're out, then begins recording your caller's message up to 60 minutes long. It shuts off when the caller hangs up. Called the Tele-Magnet®, its price is under $200.

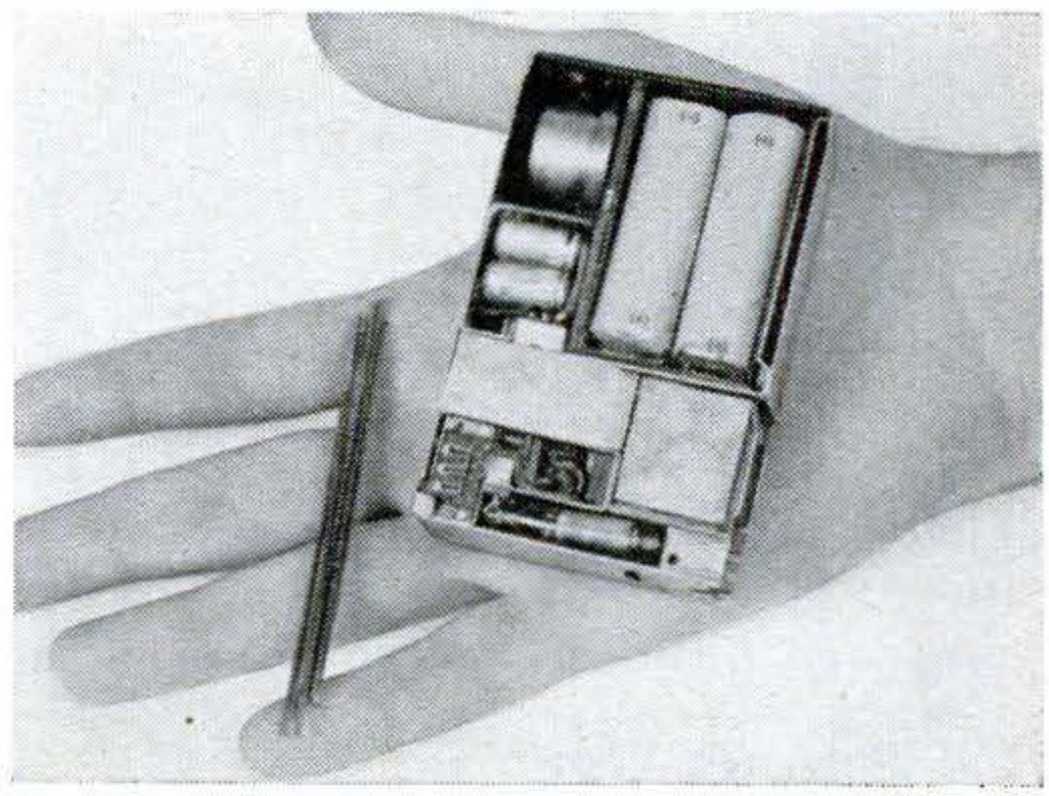


Darkroom Fits Suitcase

SET up this Copy-Roll® on its slim case (top) and you can make 30 photocopies an hour of a legal-size sheet. To print, put original against sensitized paper and roll them with transparent plastic tube (lower picture) enclosing light bulbs. Developer, fixer, and washing water are sponged on. Fairchild Aerial Surveys makes the kit.

Recorder Is Miniature

THIS portable, 10-pound tape recorder, for on-the-spot pick-ups, can be carried by a shoulder strap. Called the Mini-Tape®, it measures only 6 by 7 by 13 inches and has a self-contained power supply. Made by Stancil-Hoffman, it has a tiny microphone that can be worn on lapel or wrist.



Smallest Two-Way Radio

HERE'S a 200-yard-range two-way radio that fits all its parts—including the power supply—into an 11-ounce package you can hold in your palm. Its parts consist of plug-in units that can be easily replaced. Developed by the U. S. Army Signal Corps, the set has a 2-ft., collapsible antenna.

Copyrighted material

Here's the old and the new, with the different sizes of records available for each. Note big center hole on the RCA record in the middle.

What's What in the Platter Battle

The old disks have been re-engineered, and two entirely new recording systems are fighting for your approval.

By Robert Gorman

WHEN RCA uncorked a new idea in phonograph records this spring—the industry's second big change since last summer—millions of U. S. phonograph owners found themselves with a tough question to answer. Shall I switch over to the new long-playing, 12-inch records, or to the even newer, small records put out by RCA?

It's a hard question, because either record requires also the purchase of a special attachment for the home phonograph. The devices are different—and not cheap.

The confusion facing the purchaser of records springs from attacks made on standard grooving by both Columbia and RCA. A conventional record is played on a turntable going at 78 r.p.m. The groove is wide. It has to be: the record must play on both the old acoustic phonographs and the newer electronic machines. The acoustic machine's arm may have a needle pressure of half a pound or more. The electronic pick-

Copyrighted material

up may put only ¾ of an ounce on the stylus. Groove characteristics have had to accommodate this variation.

Last summer Columbia popped on the market something brand new—a 12-inch platter that played not the standard five minutes, but a full 23 minutes. Big chunks of symphonic music could be reproduced without breaks. Columbia achieved this with tiny grooves—made possible by eliminating acoustic requirements—and by low speed. Instead of revolving at 78 r.p.m., the record turns at 33⅓.

Now RCA has made its attack. It's different. Its special turntable spins at 45 r.p.m. Instead of a long-playing record, RCA has produced the equivalent of a 12-inch platter on a disk only 6⅞ inches in diameter. The company's low-speed records will be in this uniform size. Another innovation is a 1½-inch center hole to suit the records to a special high-speed changer.

Many reasons have been advanced for RCA's failure to follow Columbia's lead. One is that no one wants to listen to a solid 23 minutes of a single popular jingle. (Columbia has lately announced a 7-inch disk as well as the 10- and 12-inchers.) RCA engineers assert that 45 r.p.m. is the ideal speed, while their opposite numbers at Columbia say that 33⅓ is the best for getting the most good music in the least space. Both claim big advantages in record storage, though in different ways. Columbia points out that a single 12-inch disk takes the place of a whole album of 78-r.p.m. records. RCA counters by pointing out that its little records fit nicely in a bookshelf.

Both of the slow-play records offer a bonus advantage. They are pressed in unbreakable plastic and have much less surface noise than conventional shellac records. The plastic, which has been available at a premium price for some 78-r.p.m. records, is especially suited to the increased frequency range of the new systems.

The new records will sell for less. A single 12-inch long-playing classical record retails for about $4.85. It contains the musical equivalent of a four- or five-record album selling for $6 or more. The same amount of music (on four or five disks) on RCA records will cost $4.30 to $5.25.

Since there are an estimated 16 million old-style turntables in the country, and billions of records that can be played only on them, the change-over period will obviously be troublesome. Both Columbia and

Same music recorded three ways. At left is a conventional 78-r.p.m. album; at top right, a single Columbia Microgroove® disk of the same piece. Lower right shows the RCA disks needed.

RCA plan to continue to make 78-r.p.m. disks. Record players that will handle the old disks and one or both of the new ones are coming on the market.

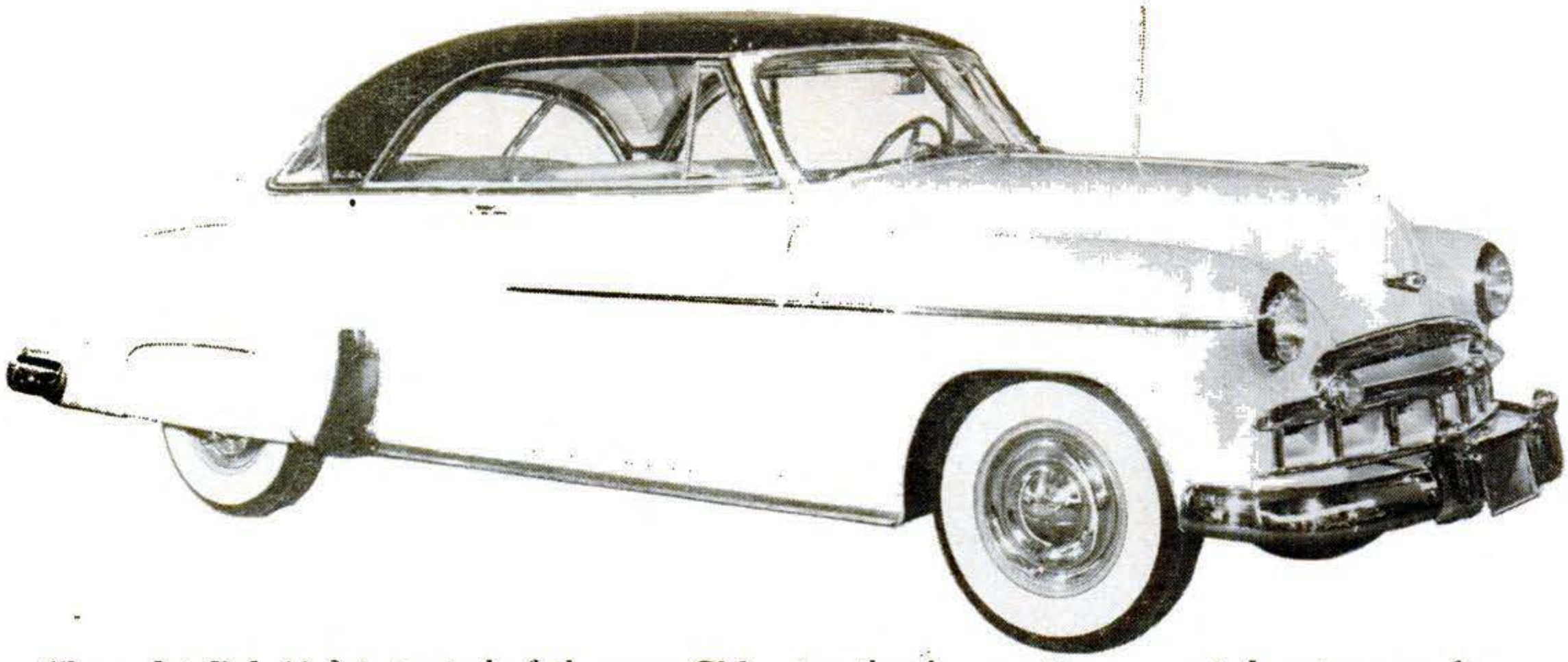
From a technical viewpoint, the change-over is long past due. Experts say that 78-r.p.m. recording has been obsolete for years. Established in the day of acoustic recording, this speed was needed to get even a minimum of fidelity scratched into and out of the shellac. The development of electronic recording and playback heads made possible fine recording, and reproduction at much lower speeds. A 78-r.p.m. disk delivers about three-quarters of a second of music on each spin. At 33⅓ r.p.m., a turn gives almost two seconds of music.

As important as speed is groove size. Industry standards established 25 years ago called for 85 to 98 lines per inch (depending on the amount of music to be squeezed on a side), and modern 78-r.p.m. records still range between 80 and 140 lines. In contrast, the new RCA records get up to 275 grooves to the inch, and Columbia's go as high as 300. Stylus pressure has been cut to a sixth of an ounce and tip diameter to .001 of an inch. This combination of light pressure and low speed promises greatly improved record life.

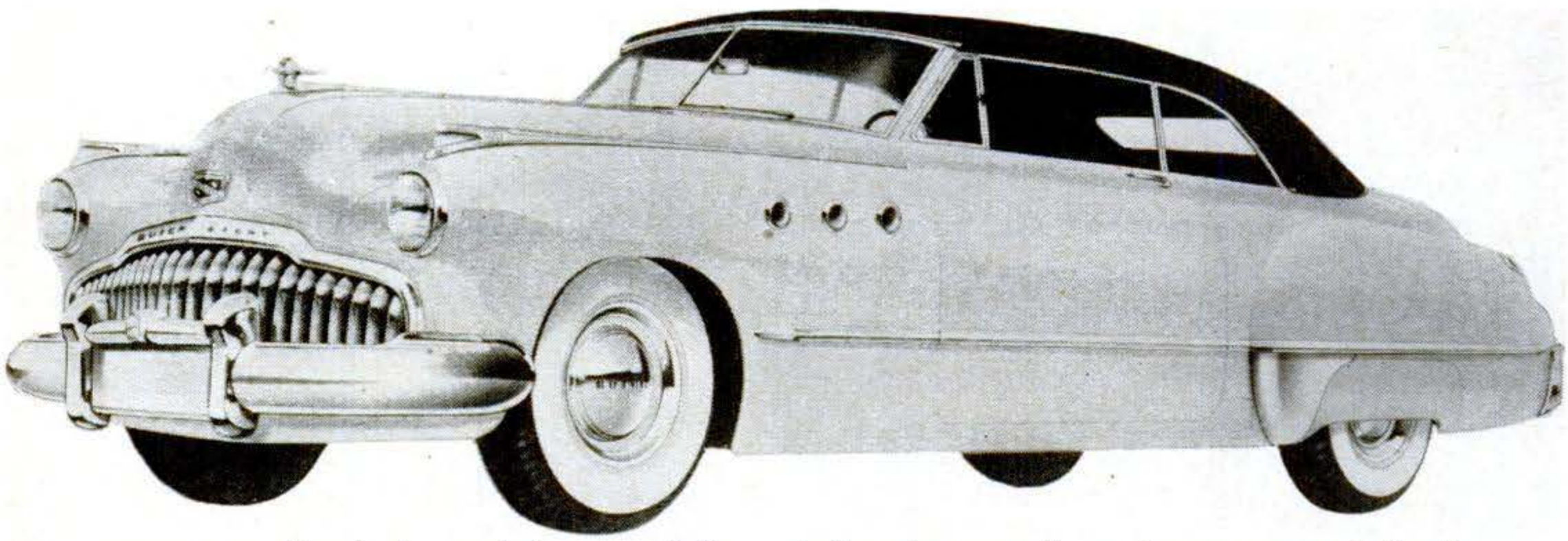
One thing a prospective buyer should ask himself is whether the rest of his equipment is up to the new records. Chances are it isn't, unless the amplifier and speaker are among the very best. In fact, many players now being sold especially for the new records don't really do justice to them.

So you pays your money and you takes your choice—and if you're smart you keeps your fingers crossed. END

Copyrighted material



Chevrolet Bel Air® is typical of the new GM hard-top "convertibles." Notice how the rear corners of the top come almost to V point, allowing the three-section rear window to curve forward. Top is painted to contrast with body. Lack of a door post gives open-air freedom.



For comparison, here's the real thing—a 1949 Buick Super Convertible®. When you see it, one distinguishing point will be the narrow-slit back window that cuts down the rear vision. Like the actual convertibles, the new hard-tops are swanky jobs for which you pay a higher price.

New Steel Tops Look

FOR motorists who like the looks of a convertible but are nervous under a tent on wheels, the automobile industry has an ingenious answer. It's a car that has the styling of a convertible but the sturdy, all-steel top of a standard model.

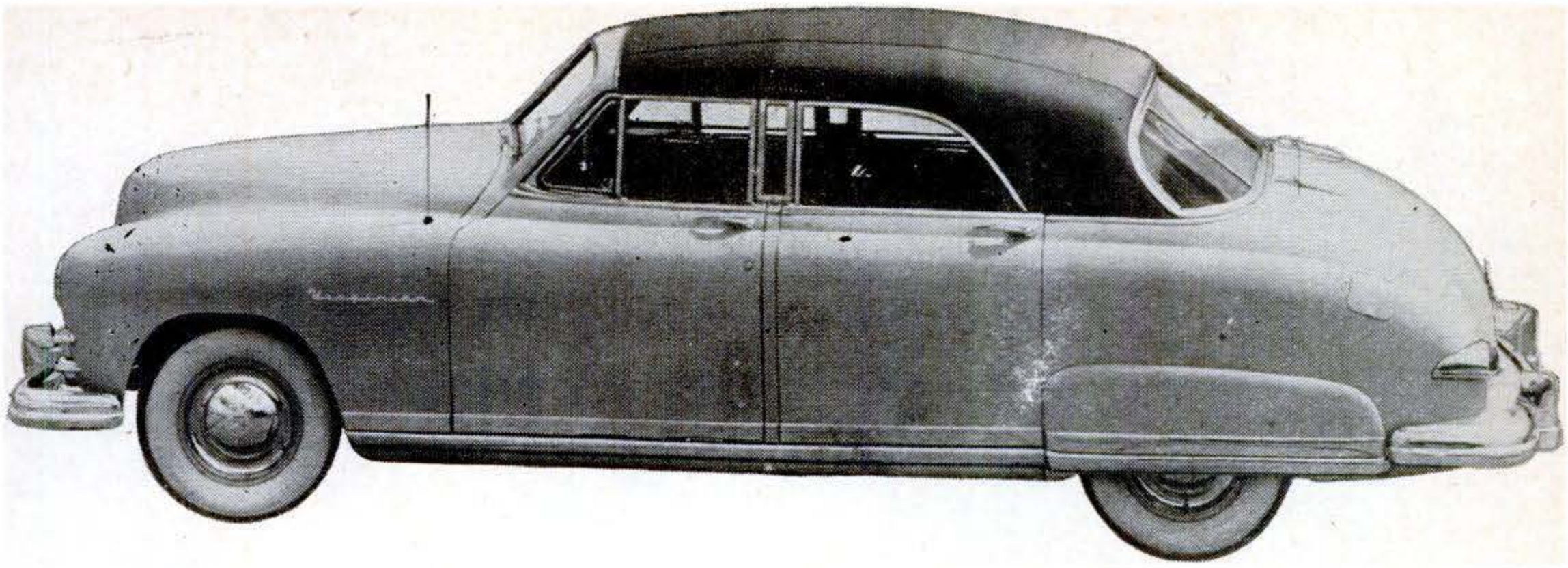
All divisions of General Motors are putting such a car into production this spring. Kaiser has been showing one for several months. In each case, the top is a sheet of heavy metal, stamped to shape, then reinforced and welded rigidly in place.

In styling, you must look sharp to tell the substitute from the real convertible. Kaiser uses a satiny nylon fabric and padding to conceal the metal top of its plushy new Virginian®. General Motors does the trick with enamel, different in tone from the body.

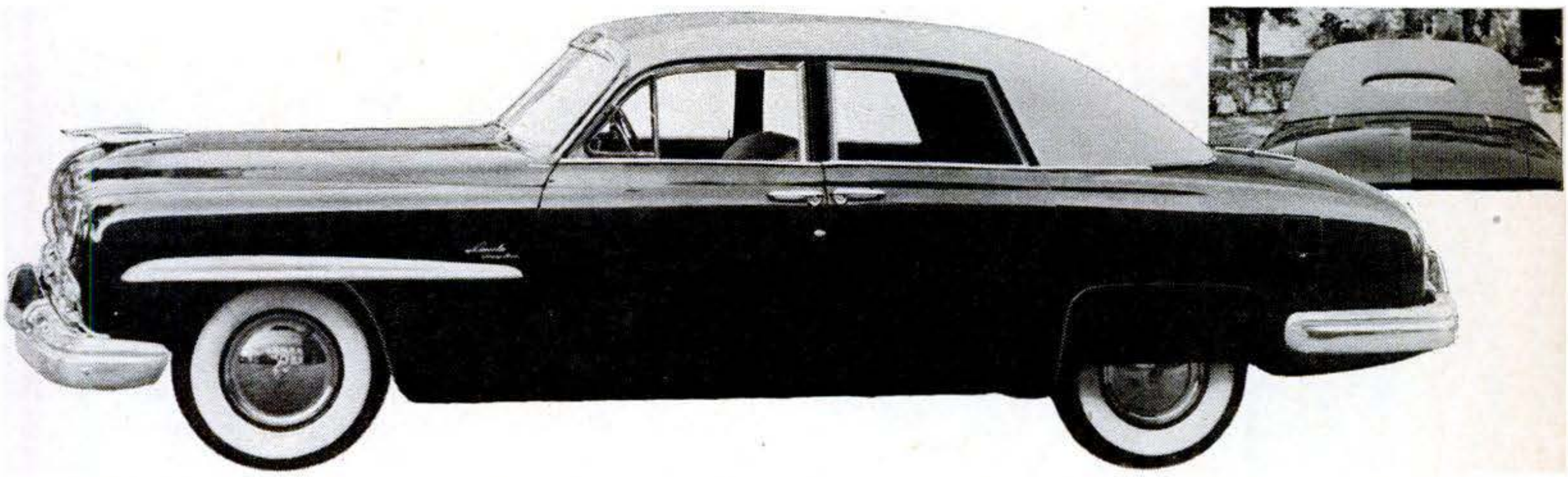
This trend harks back to earlier days. A top that looks, or is, different from the rest of the body has long been a sign of the ultra ultra. Padded fabric on a fixed top was a feature of a 1925 Studebaker. Currently, the Derham Custom Body Company in Rosemont, Pa., is filling a few dealer orders for a sporty fabric top bonded to the metal roof of the Lincoln Cosmopolitan® sedan.

All the new GM hard-top "convertibles"—

Copyrighted material



Kaiser Virginian® looks like true convertible, but under its nylon top is a rigid steel roof. Rear window measures 73 inches across. Narrow window between the doors is permanently fixed. The car closely resembles real Kaiser convertible. The delivered price is just short of $3,700.



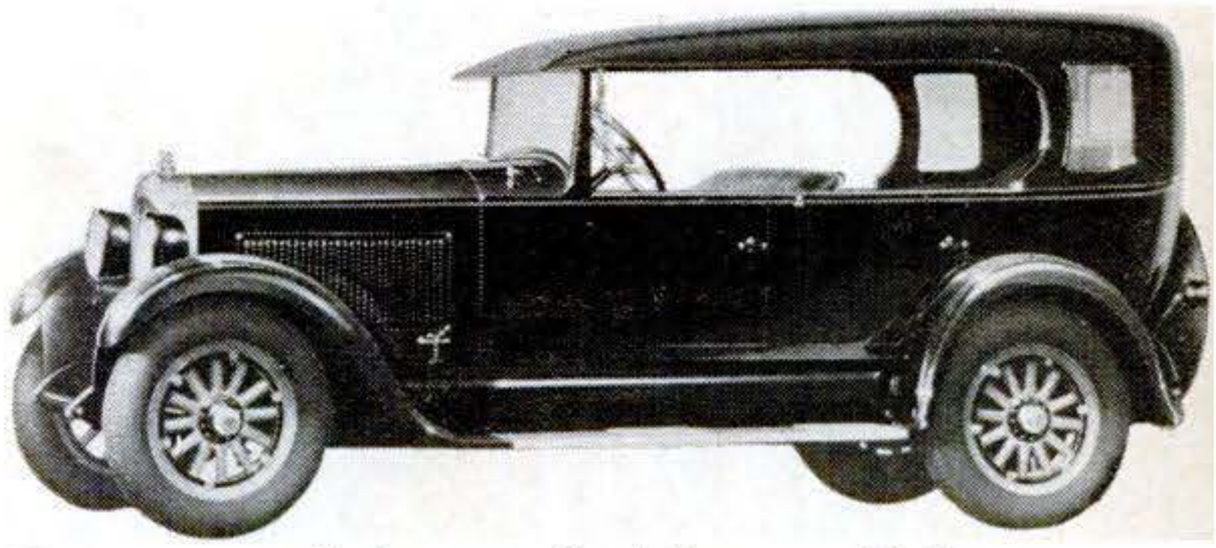
Fabric top bonded to metal roof raises price of Lincoln Cosmopolitan® to more than $5,000. This is a custom job, done by the Derham Body Company only on order of dealers. Ford Co. itself has not joined hard-top trend. Oval rear window gives privacy, but limits vision.

Convertible

Cadillac Coupe de Ville®, Oldsmobile Holiday Coupe®, Buick Riviera®, Pontiac Catalina®, and Chevrolet Bel Air®—are two-door jobs with a rear seat. The Kaiser Virginian® is a four-door model.

Center door posts are omitted in the GM cars. Rear quarter windows, rising from the body, fit closely against those in the doors. With the windows open, there's a clear sweep from front to rear, giving in part the open-air freedom of a true convertible.

In all GM models except Cadillac, the metal top comes almost to a V at each rear corner. End sections of the three-part, forward-sloping rear windows curve around the hitherto blind corners. Cadillac and Kaiser rear windows are also curved, but don't extend as far around. END



Forerunner of the new fixed "convertible" top was found on this 1925 Studebaker Special-Six Duplex Phaeton®. It had padded cloth over wood. Note large window area at the rear.

Copyrighted material

Must We

No—not when science

By George H. Waltz, Jr.

SMOKE costs Americans more than five billion dollars a year. If the smoking chimney could be completely eliminated, you as an average city dweller or suburbanite would save at least $20 a year on your own personal laundry and cleaning bills. Your fuel bill would be pared down a fifth. Your wife's household cleaning chores would be cut in half (smoke adds about 10 pounds of dirt to the average house every month). Your house would need repainting only a third as often. And you and your family would have to suffer through only about half as many colds and respiratory ailments as you now do.

Smoke is not only dangerous and expensive—it is unnecessary. It can be eliminated

If annual "smoke fall" in the U. S. were spread evenly over New York City streets, it would form layer 21 feet deep. In 50 years, it would cover 101-story Empire State Building.

Copyrighted material

Suffer Smoke?

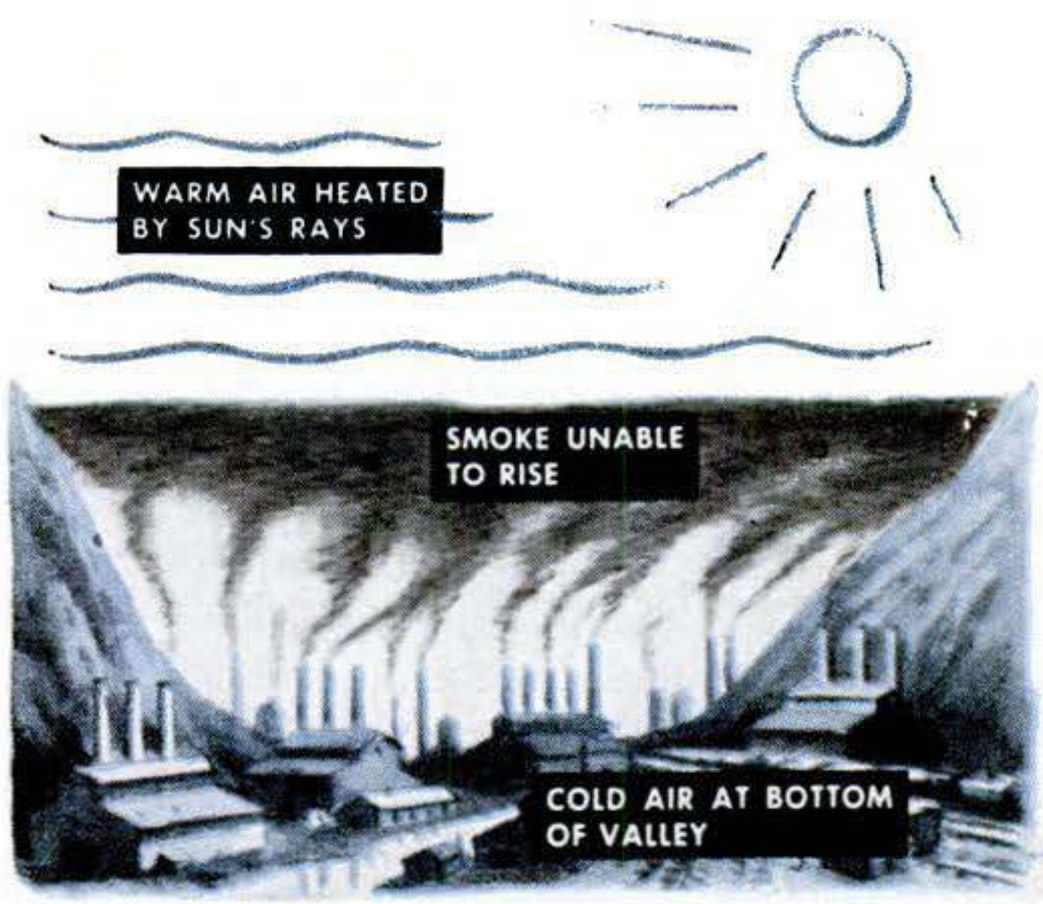
has given us a dozen ways to get rid of it.

easily at the source. It can be laundered with water. It can be dry-cleaned with electricity. It can be de-sooted with sound waves. It can be dispelled with giant "smoke guns." Science has provided at least a dozen ingenious ways to get rid of smoke and, in many cases, the smoke-eliminating or cleaning equipment pays for itself within a year by salvaging valuable by-products that normally go up the flue.

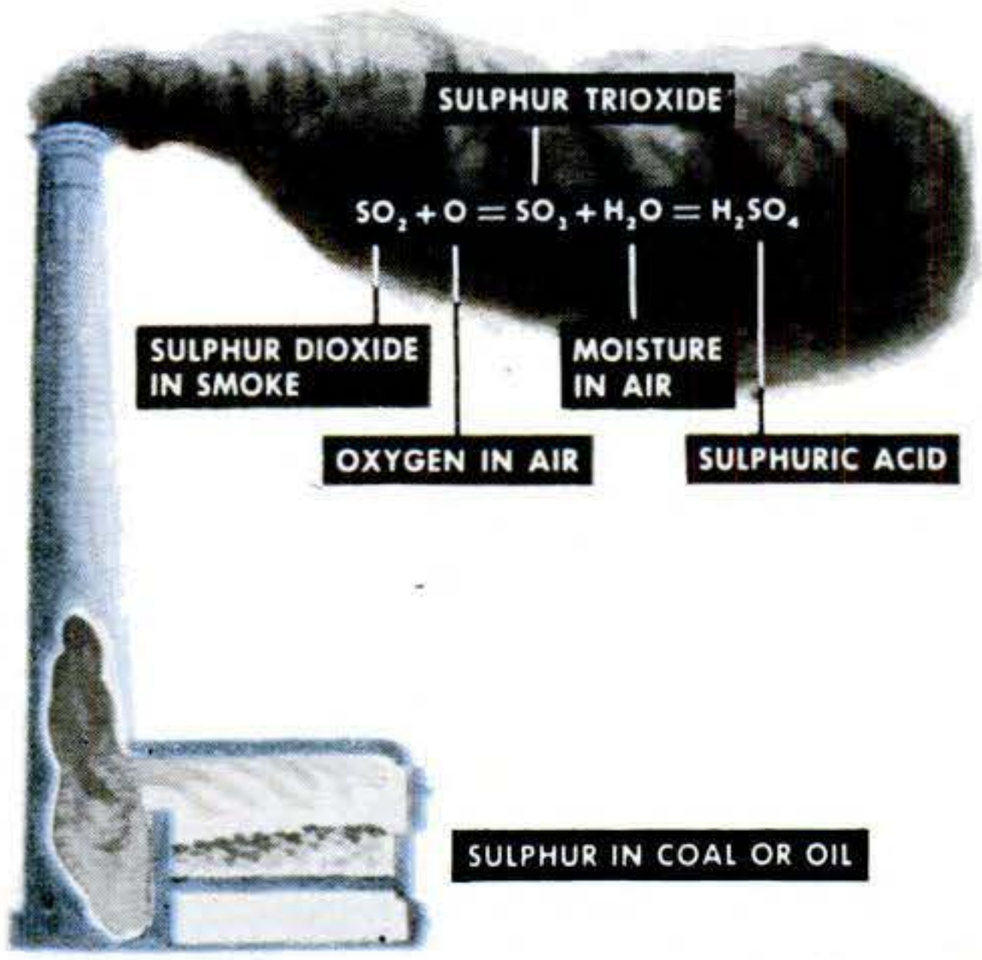
A few years ago, the owner of a large West Coast smelting plant was finally forced by his neighbors to do something about the clouds of soot and grime that his stacks were spewing over the California countryside. Reluctantly he spent $50,000 for special equipment to clean his smoke by removing the solids it contained. At first it seemed like an expensive process. But each year now he happily retrieves an average of 4,680 barrels of lead oxide from his flues—and sells it for a neat $93,600!

The smoke cleaner used in this particular installation is of the settling-chamber type, one of the simplest. The smoke on its way to the stack enters a large chamber fitted with baffles. As the smoke follows its winding course through this back-and-forth maze, its velocity is slowed to a point where it can no longer carry the heavier solid particles along with it. The particles then settle out and fall to the bottom of the chamber where they can be collected.

The most ingenious and effective method for cleaning up industrial chimney exhaust uses electricity and literally shocks the soot out of the smoke. This type of smoke cleaner, known as a Cottrell precipitator, can be



Drawing above shows how "lid" of smoke often forms over industrial town in valley. When earth is colder than upper air, lower air cannot rise, and smoke is trapped close to the ground.



Deadly sulphuric acid gets into air when sulphur in coal or oil burns, giving off sulphur dioxide. This plus more oxygen then forms trioxide, which reacts with moisture to form acid.

Copyrighted material

fitted directly into the flue system of a large industrial smokestack. When the smoke enters the precipitator, metal plates negatively charged with electricity give the solid particles a negative charge. As the charged particles then pass over another series of plates that are positively charged, the negative particles are attracted to the positive plates and cling to them until collected.

The Cottrell precipitator, named after its inventor, Frederick Gardner Cottrell, is widely used by industry not only to clean smoke but to retrieve valuable by-products. Large public-utility companies are among the biggest users. In dry-cleaning their smoke with electricity they salvage fly ash that they then sell to light-metal foundries, which use it in making their molds. Building-block manufacturers, who find the ash an excellent ingredient of their mix, are also customers.

Thanks to Cottrell precipitators, more than one manufacturer of cement not only eliminates his smoke problem but reclaims cement particles and chemicals that otherwise would be wasted. During the war, one manufacturer actually made more out of the potash he salvaged from his chimneys than he did out of the cement he produced.

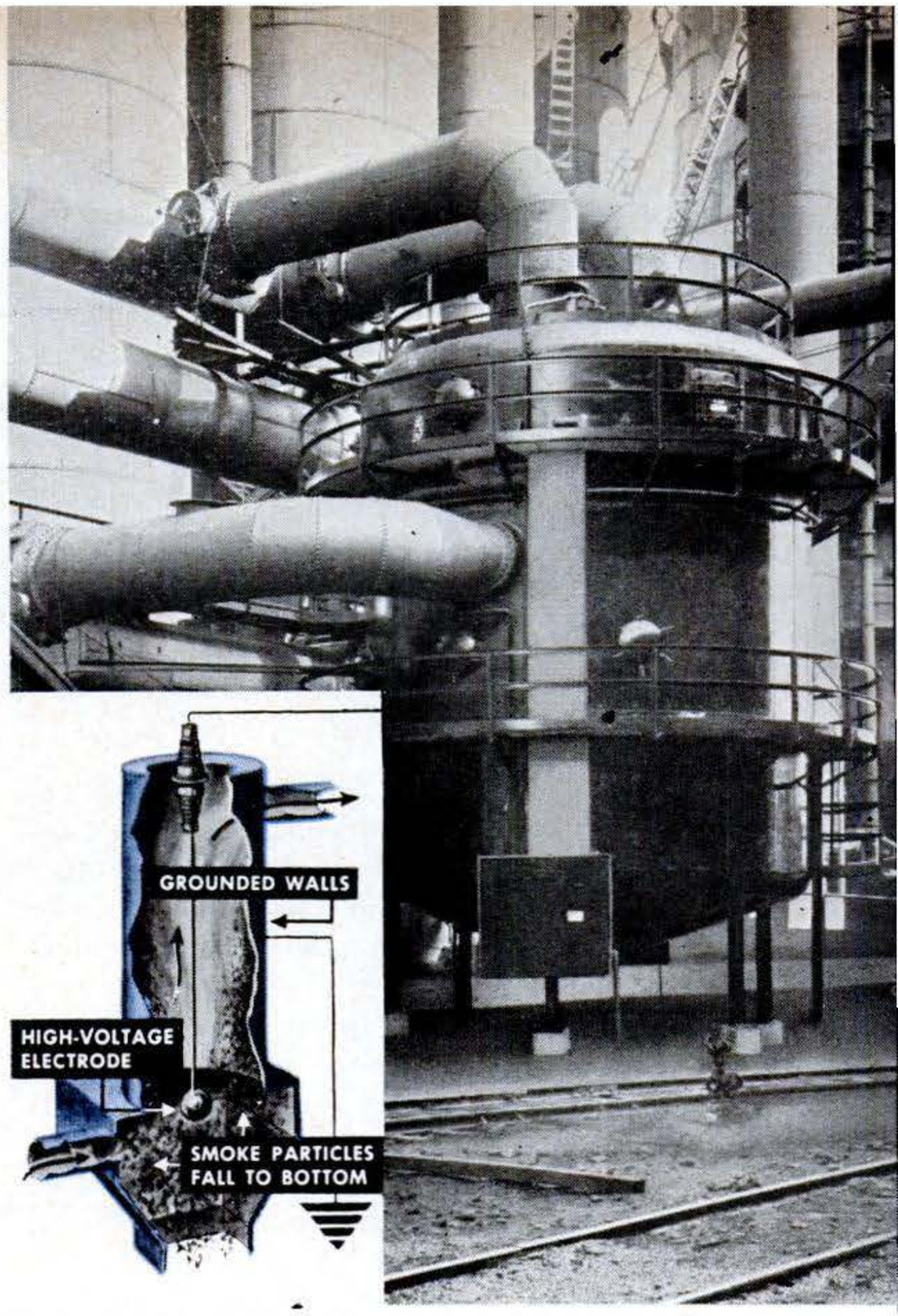
Soot "Hears" What You Can't

Newest of the smoke-cleaning methods makes use of sounds so high-pitched that they are inaudible to the human ear. Just as the electrical precipitator shocks the soot out of the smoke, the high-frequency sound waves literally shake it out. The system, still in the experimental stage, consists of allowing the smoke to enter a chamber containing a sound-wave generator. As the high-frequency waves course up through the smoke, they cause the solid particles, no matter how microscopic, to cluster together or "ball up." Their combined weight then makes them precipitate out and fall to the bottom of the chamber. The method is similar to that being tried for dispersing fog at airports (PS, Feb. '48, p. 135).

Nor are these the only smoke killers. Water sprays, thermal precipitators, and centrifugal precipitators also do effective jobs.

In the water-spray system, the smoke is literally washed clean. The water carries away the solid particles while the remaining gases pass up the flue.

Thermal precipitation, on the other hand, makes use of the same old law of physics that causes the troublesome black streaks

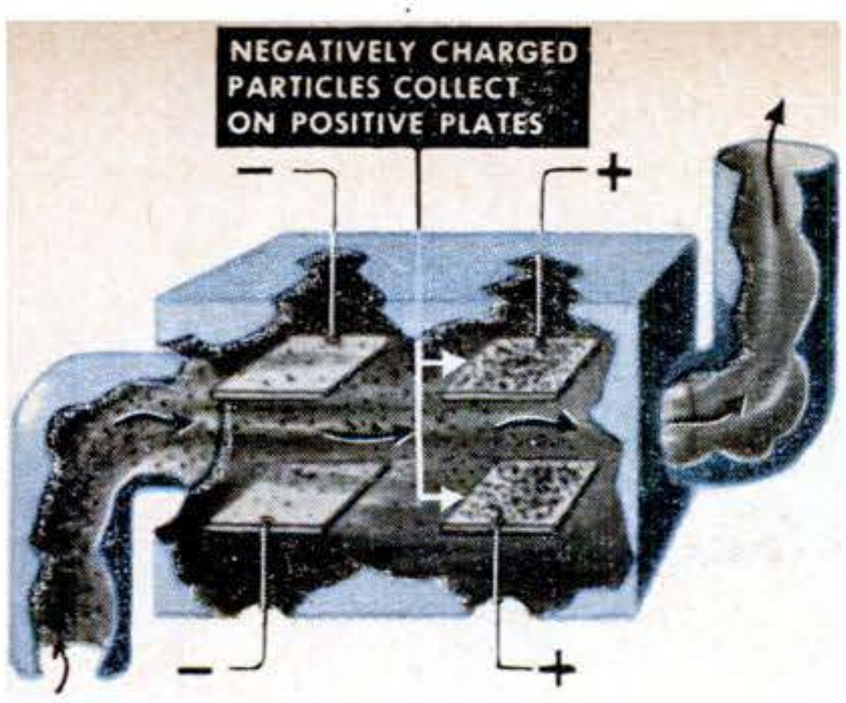


This electrical blast-furnace precipitator shocks soot loose. High-voltage electrode in center (inset) charges particles, which then move to grounded walls, lose charge, and fall back.

and weblike dust that form on the walls behind your radiators. Soot and grime, circulated by the rising heat from the radiator, hit the wall, which is cooler than the air, and are precipitated onto it. In a similar way, particles in smoke passing through a thermal precipitator, which consists of one heated wall and one cooled wall, are precipitated onto the cooled wall.

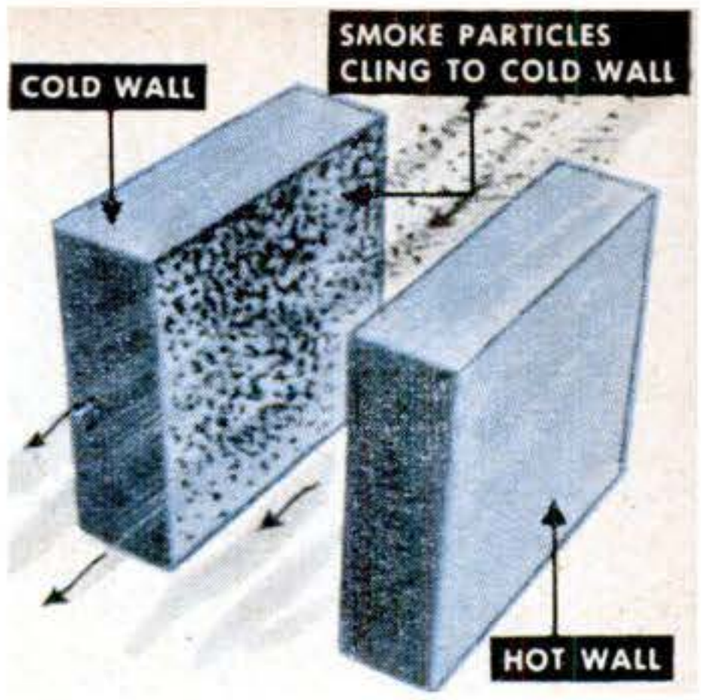
In a centrifugal precipitator, the smoke is whirled so violently that the solid particles in it are thrown out, just as the water is removed from sodden clothing in the conventional home-laundry spin drier. One type of centrifugal precipitator is now being tested on the stacks of steam locomotives. If it proves successful, it will go a long way toward solving the smoke problems in localities near large railroads and railroad yards. In railroad cities, like Chicago, it has been estimated that at least 15 of the 70 tons of smoke dirt that fall on each square

Copyrighted material



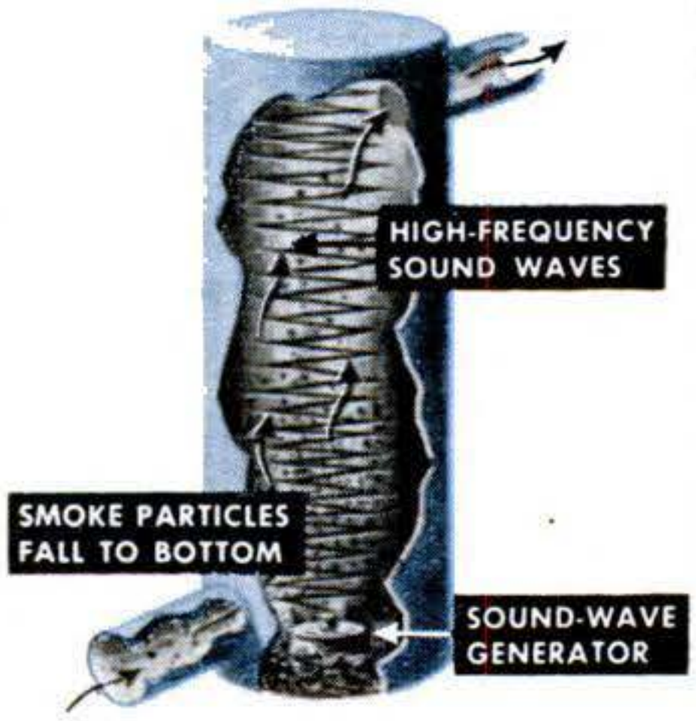
In plate-type electrostatic precipitator, smoke particles are charged by negative plates, then trapped by positive plates.

Water-spray cleaner uses high-pressure jets of water to wash solid particles out of smoke, letting only gases pass.

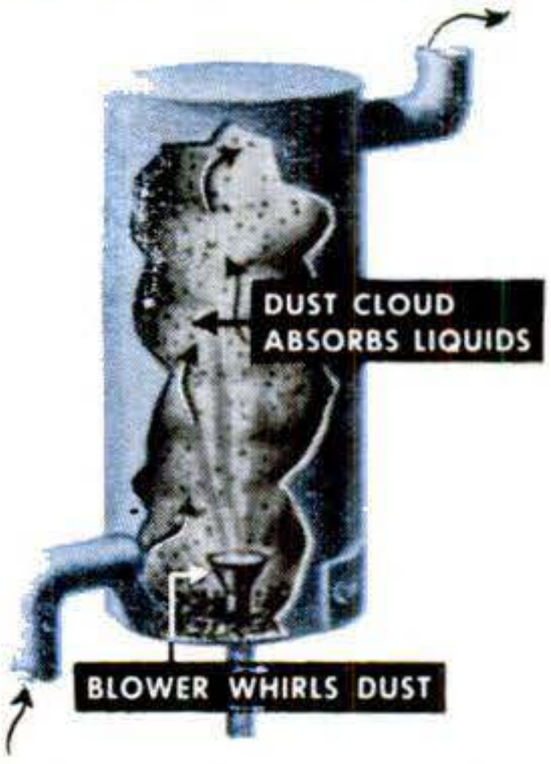


In condensation method, particles passing between two walls are heated by hot wall, then caught on cold one.

Mazelike settling chambers slow smoke's speed until it can no longer carry heavy solid particles, which then fall out.



High-frequency sound waves in this system shake soot out. Particles cluster, fall to bottom of chamber by own weight.



In dust chamber, whirling cloud of fine clay or silica-gel particles absorbs acids and other harmful smoke liquids.

mile every month come from the smoking stacks of steam locomotives.

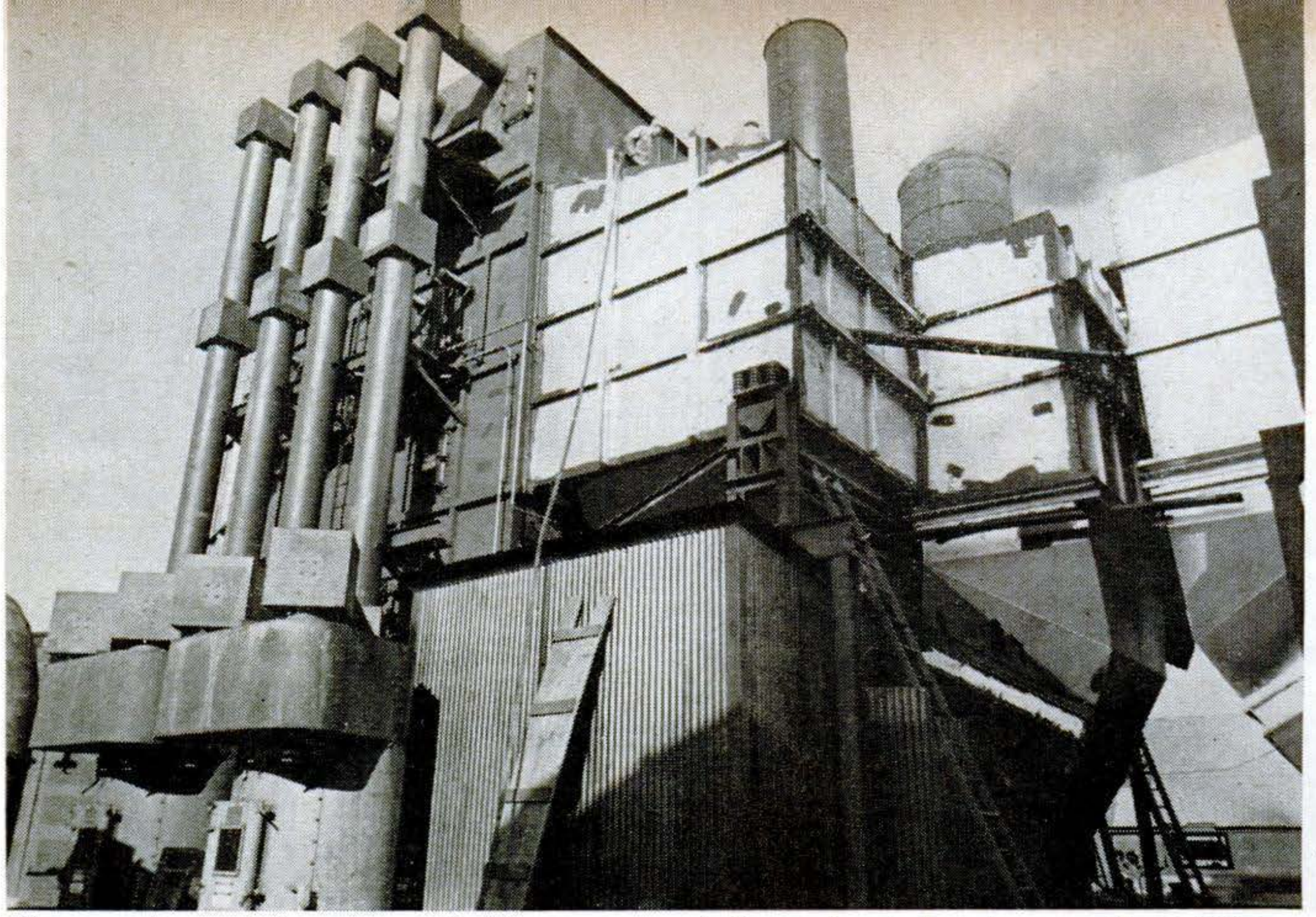
Smoke, depending on its source, can contain a variety of dirt and chemicals, ranging from simple unburned carbon to sulphuric acid, formaldehyde, and highly toxic fluorine—even phosgene, deadly poison gas of World War I. Every cubic foot of city air in the winter contains about 3,000,000 particles of solid matter plus assorted liquids and gases.

Fortunately, if a high percentage of the solid matter is successfully removed from smoke, a considerable portion of the liquids is also removed. Like the water droplets in the atmosphere that accumulate on dust particles to form fog, the liquids in smoke tend to collect on the solids. Thus the liquids are removed along with the solids.

In cases, however, where smoke is known to have a high concentration of sulphuric acid or some similar highly corrosive liquid, Dr. H. P. Meissner and Dr. H. S. Mickley of the Massachusetts Institute of Technology suggest the use of a novel filter in the form of a whirling cloud of dust. In their system, smoke, or exhaust from a chemical process, is piped into a chamber housing a continuously whirling mass of powdered clay or silica gel. Acting like tiny sponges, the dust particles soak up the liquids in the smoke before it is expelled into the air. In actual operation in a factory flue system, a small side stream of the used dust will be removed as fresh material is added to form a continuous filter.

Basically, a major portion of our over-all smoke problem, however, can be solved merely by the right choice of fuel combined with the careful firing of furnaces used for heat and power. That's how St. Louis, long dogged with an average of more than 100 hours of black smog a year, cleaned up its air. A law was passed—and enforced—re-

Copyrighted material



Electrostatic precipitator on roof of large central-heating plant in St. Louis removes fine fly ash from exhausted coal gases. About 150 tons of the ash are collected in this way every day.

quiring householders as well as industry to use either an easy-burning fuel, like hard coal, gas, or oil, or improved furnaces and firing methods to insure complete combustion of the smoky soft coal widely used in the region. St. Louis' smog seldom shows up these days. When it does, it generally is blown over from some nearby industrial town. Pittsburghers, using similar methods, now see 39 percent more sun than they used to see.

In Los Angeles, where eye-smarting smogs are held over the city by temperature inversions, experts have devised a "smog index" that allows them to forecast smog conditions accurately so they can then warn industrial plants in the neighborhood to limit the amount of contamination discharged into the air. A special smog chamber also allows them to reproduce smog conditions for tests.

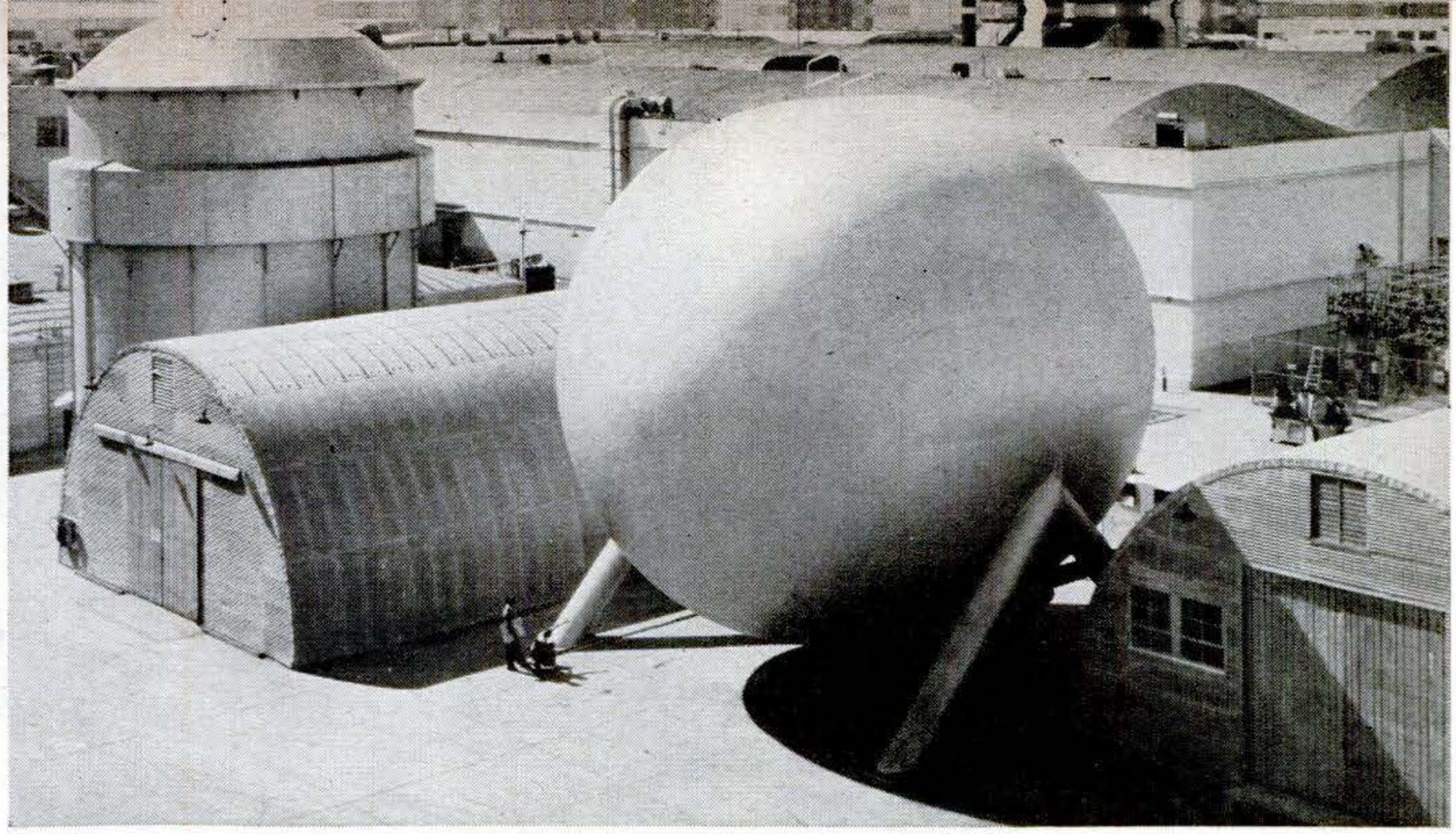
One of the most unusual plans for getting rid of unwanted industrial smoke has been suggested by Dr. Phillips Thomas of the Westinghouse Electric Corp. His method consists of shooting slugs of smoke skyward at high speed from giant "vortex guns." Dr. Thomas' vortex gun consists of a drumlike chamber having a diaphragm at the bottom and a hole at the top, like a larger version of the device used to blow smoke rings in the famous Camel cigarette sign (PS, Jan. '47, p. 99). The chamber would be filled periodically with the smoke from an industrial plant. Then the diaphragm would be jolted upward by an explosive charge to send a giant smoke ring skyward.

With a sufficiently powerful gun, Dr. Thomas estimates, it would be possible to shoot such smoke rings up at a speed of 1,000 m.p.h. to an altitude of a mile or more. At that height, they would be dispersed and blown harmlessly away by the strong upper winds! END

Meteors Give Siberia One-Two Punch

A METEORITE that fell in eastern Siberia in 1947 was probably one of the largest on record, according to a recent ground and aerial survey that estimates its weight as about 1,000 tons. Breaking into fragments high in the air, it struck with a noise heard more than 100 miles away, blasting craters up to 92 feet in diameter and 20 feet deep. Northern Siberia in 1908 was the target of a gigantic 40,000-ton meteorite. The meteorite that blasted out Meteor Crater in Arizona, probably thousands of years ago, has been variously estimated as 100 to 1,000 feet in diameter, indicating a weight of between 65,000 and 65,000,000 tons.

Copyrighted material



Pumps in building at far right suck air from 36,000-cubic-foot, spherelike chamber next to it, producing a vacuum. Dry air is stored in 48-foot-high steel tank at far left. In between is the test section in which the scale models are mounted for supersonic wind-tunnel tests.

Big Blow Is Vacuum-Made

WHIPPING up supersonic cyclones of 4,000 miles an hour is easy for the odd-looking wind tunnel above, recently completed at North American Aviation's Los Angeles plant (PS, Oct. '48, p. 118).

The new tunnel will undoubtedly be the birthplace of many guided missiles, rockets, and high-speed aircraft of tomorrow. In the blast of its airstream, more than five times faster than the speed of sound, engineers can test the aerodynamic characteristics of push-button weapons that our military airmen hope will defy detection and interception by an enemy. From it will come the know-how to build wings and fuselages with high lift and low drag, both essential to bodies moving at supersonic velocities.

The principle of the tunnel is simple. Its test section is located between an air-storage tank and a vacuum sphere. When a valve is opened, the vacuum chamber sucks dry air from a collapsible nylon balloon in the storage tank, pulling it through the test section at speeds from 900 to more than 4,000 miles an hour. The new California supersonic wind tunnel is patterned after the German Kochel tunnel being operated by the Naval Ordnance Laboratory at Silver Springs, Md. END

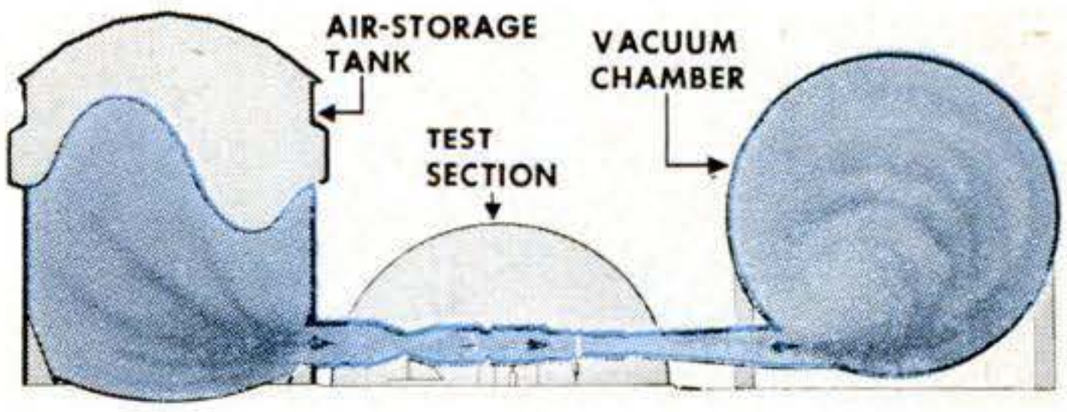
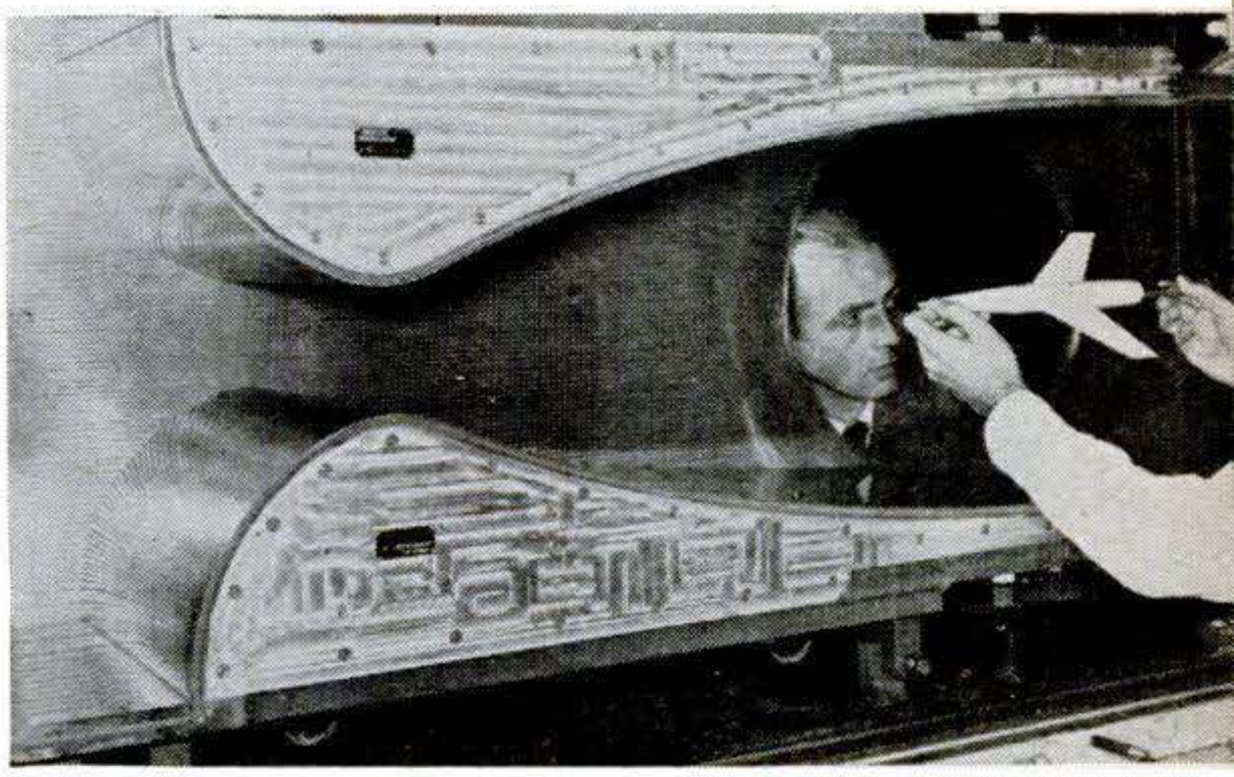
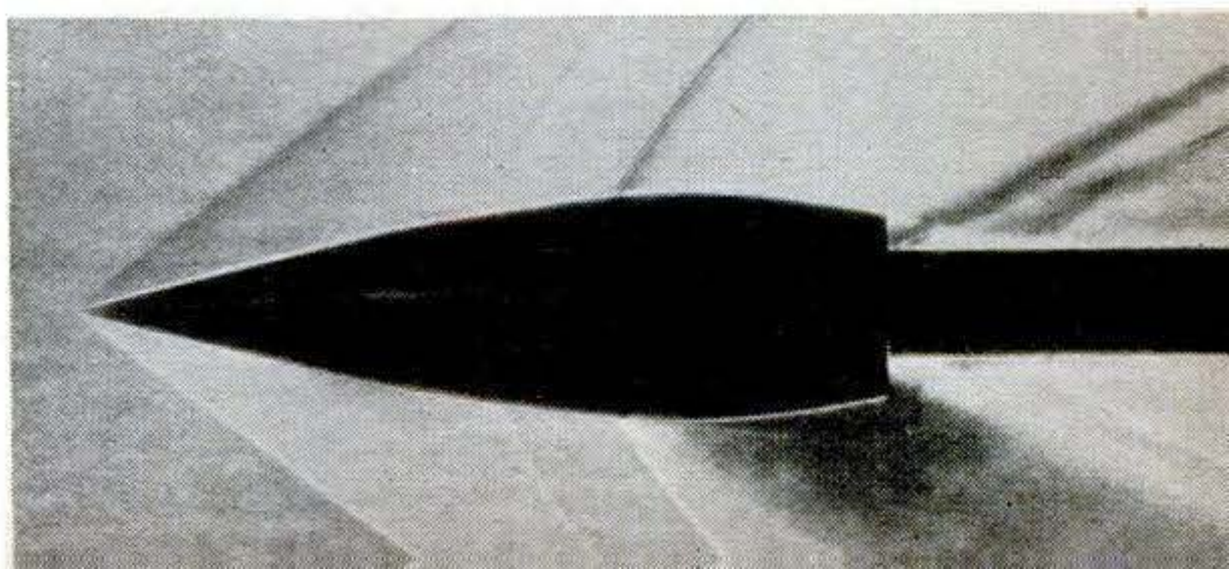


Diagram shows how air is sucked from storage tank, through test section, and into vacuum tank.

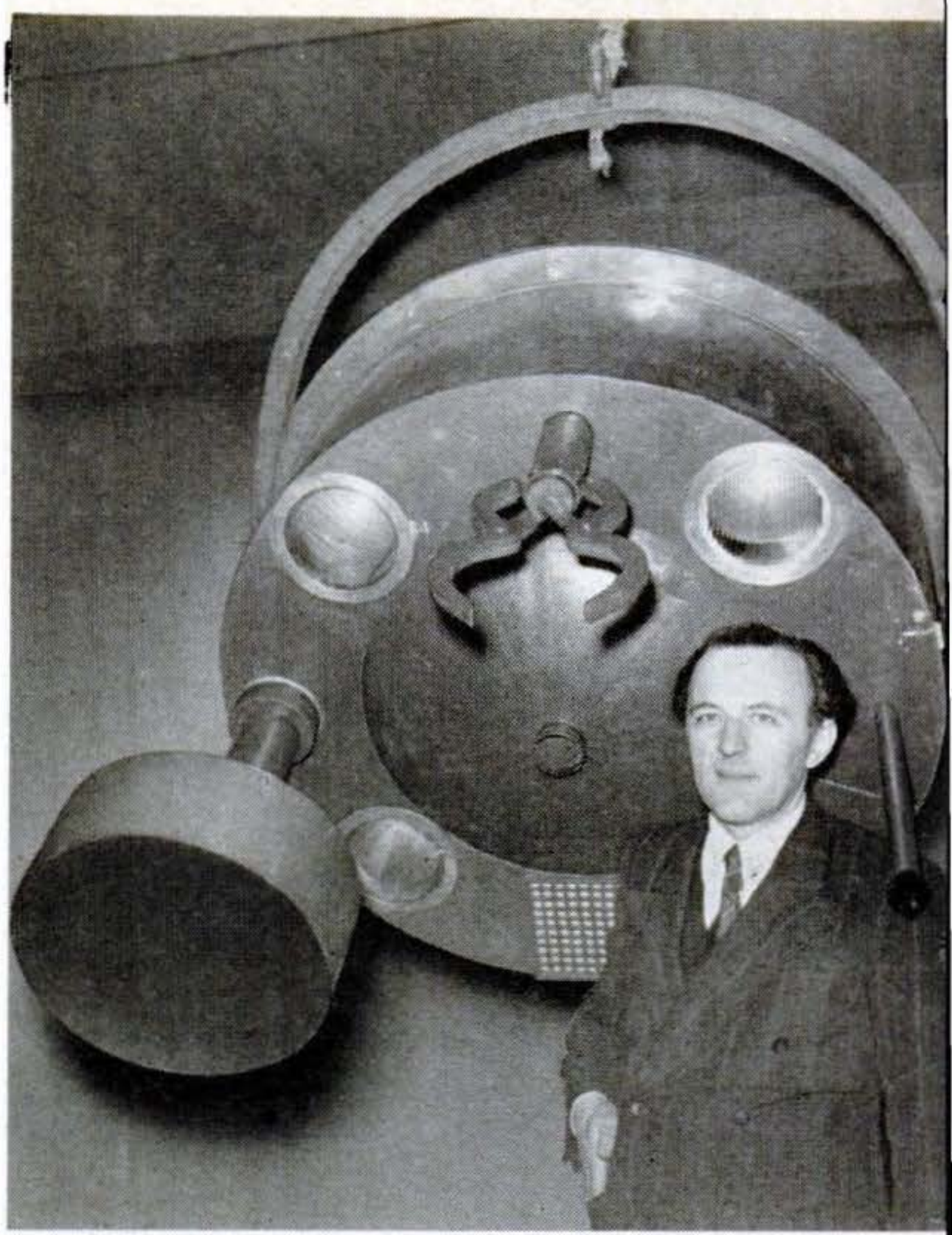


Tunnel test section, measuring 16 by 16 in., takes small-scale models of aircraft or airfoils. Its "throat" squeezes air, speeding it up so it whizzes past models at supersonic velocities.

Photograph below, taken during test, shows shock waves created by missile at simulated speed of 1,350 m.p.h. Model, held by wire, can be rotated to change its angle of attack.



Deep-Sea Automaton. Now sunken treasure may be sought at depths beyond reach of human divers with the strange undersea machine exhibited at right by its inventor, Hans von Schultz, in Dunen, Germany. Designed to salvage valuable cargoes from wrecks, the crewless automaton is maneuvered from the surface according to images transmitted by a built-in television camera, for which four powerful lamps provide illumination. By means of an electromagnet seen at lower left, the electric-powered, six-foot-diameter machine attaches itself to the hull of a derelict. Then the whole apparatus slowly rotates about the magnet shaft while an electric tool contained in the tube at right (above inventor's shoulder) cuts a circular hole for access. Finally, lowered through the opening it has made, the device grasps valuables with extensible tongs, holding them in a tight grip while it is hoisted to the surface.



Juiceless Lamps. Lighting up if shaken, these dumbbell-shaped bulbs use no electricity. Their glow, visible for half a mile, results from a reaction in a neon atmosphere between mercury and phosphors like those in fluorescent lamps. They last indefinitely and can be made in any shape or color. Inventor J. L. Cox, of the Duro Test Corp., North Bergen, N. J., sees uses on vehicles, lifeboats, and for stage effects.

Tenting in a Tunnel. Seeking a site to study mesons, most powerful and mysterious of cosmic-ray particles, Cornell University scientists have pitched camp in this old water tunnel. Twenty-five feet of limestone overhead makes a natural filter to screen out all particles but these penetrating atomic fragments. The sign in foreground warns of the high voltage of electrical instruments housed in the tent.

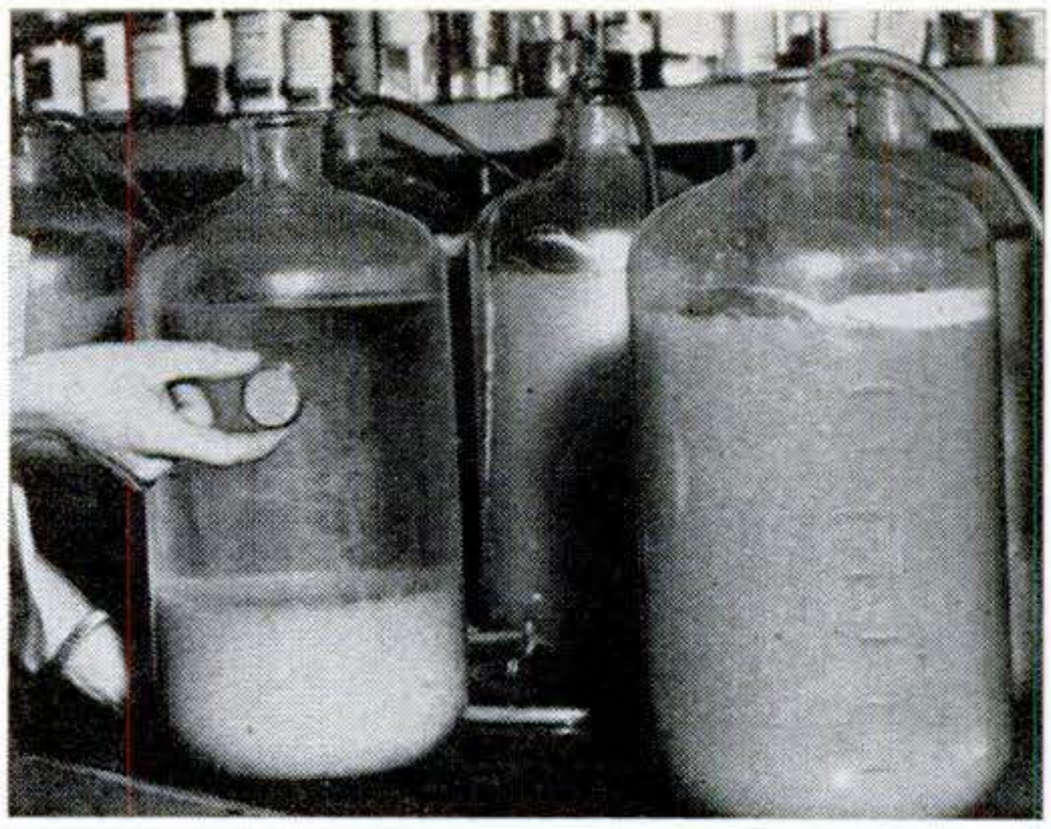
Copyrighted material

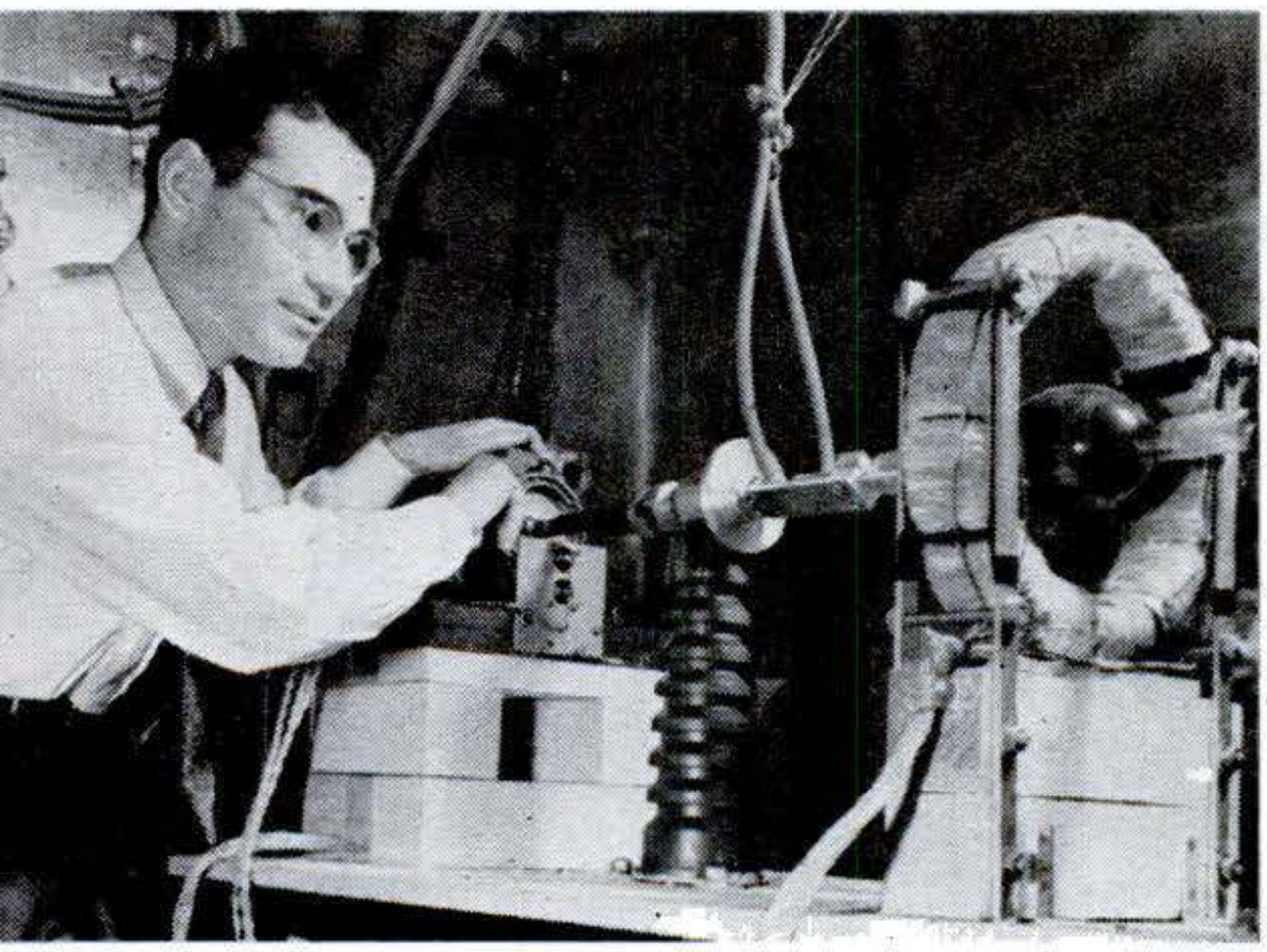
Bacteria "Eat" Radioactivity. One of the most perplexing of atomic-age problems, how to get rid of radioactive by-products, may be solved by feeding them to germs. Small-scale trials have worked, and a pilot plant is projected to apply the novel idea.

Since waste liquids containing products like plutonium will stay "hot" for centuries, storing them in costly subterranean tanks has been the only safe way to dispose of them. As time goes by and atom piles multiply, the problem will increase. There is no known way to destroy radioactivity. But any way of reducing the bulk of "hot" waste to be stored would be helpful. This is where the germs come in, according to a plan originated by C. C. Ruchhoft, U. S. Public Health Service chemist.

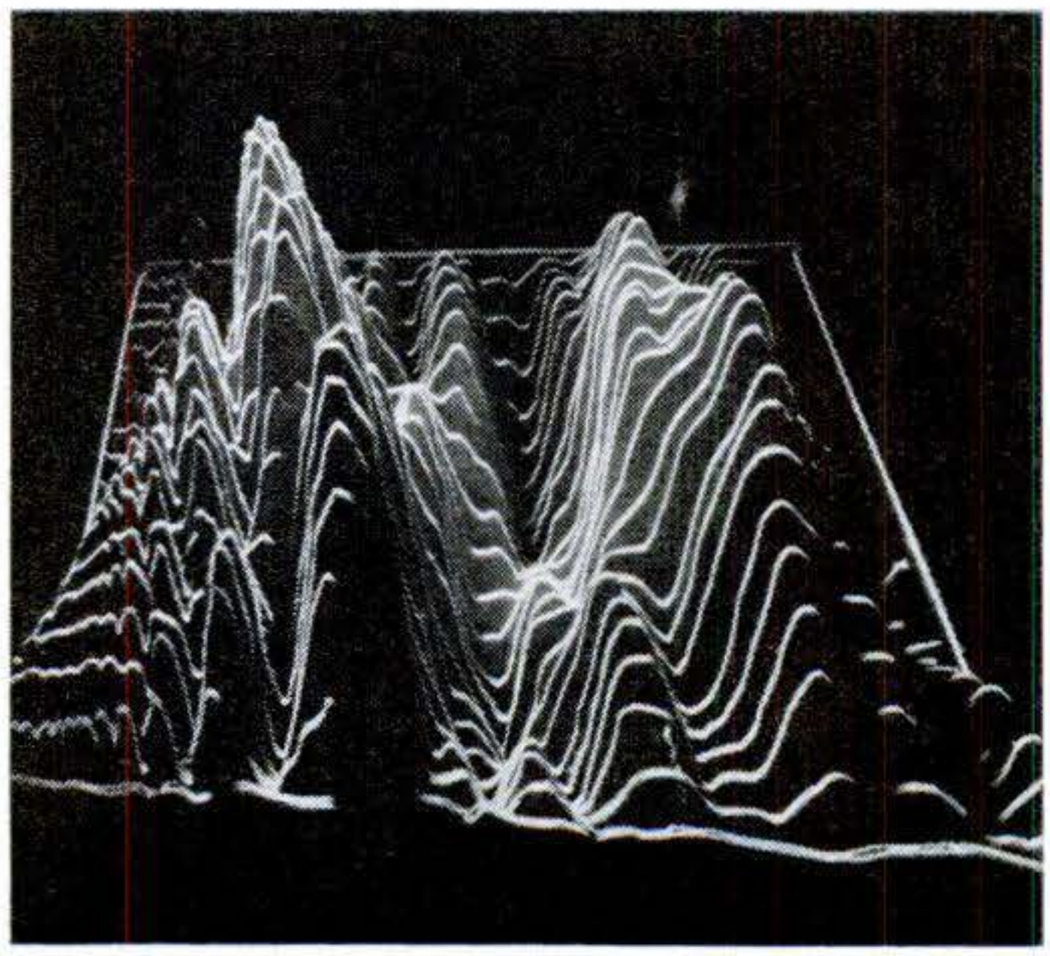
Now under study at Oak Ridge and Los Alamos atomic-energy plants, his idea is to pass waste liquids from atom piles through a gelatinous sludge containing massive colonies of bacteria. These germs will absorb and concentrate radioactive material in their cell membranes. Virtually freed of radioactivity, the purified liquid would then be safe to discharge into rivers.

Tests at Los Alamos show more than 95 percent of plutonium is extracted from fluid passing once through the germ-laden sludge; a "two-stage" process should remove 99 percent, considered sufficient. The residual sludge containing the germs and the radioactivity can be dried and compressed 700 times into tiny pellets, as illustrated above, for underground storage. So long as the germs get enough artificial nourishment—normally they live on organic sewage—they will not be bothered by the radioactivity of their strange diet. Bacteria have been found to thrive under radiation hundreds of times as intense as that which kills a man.



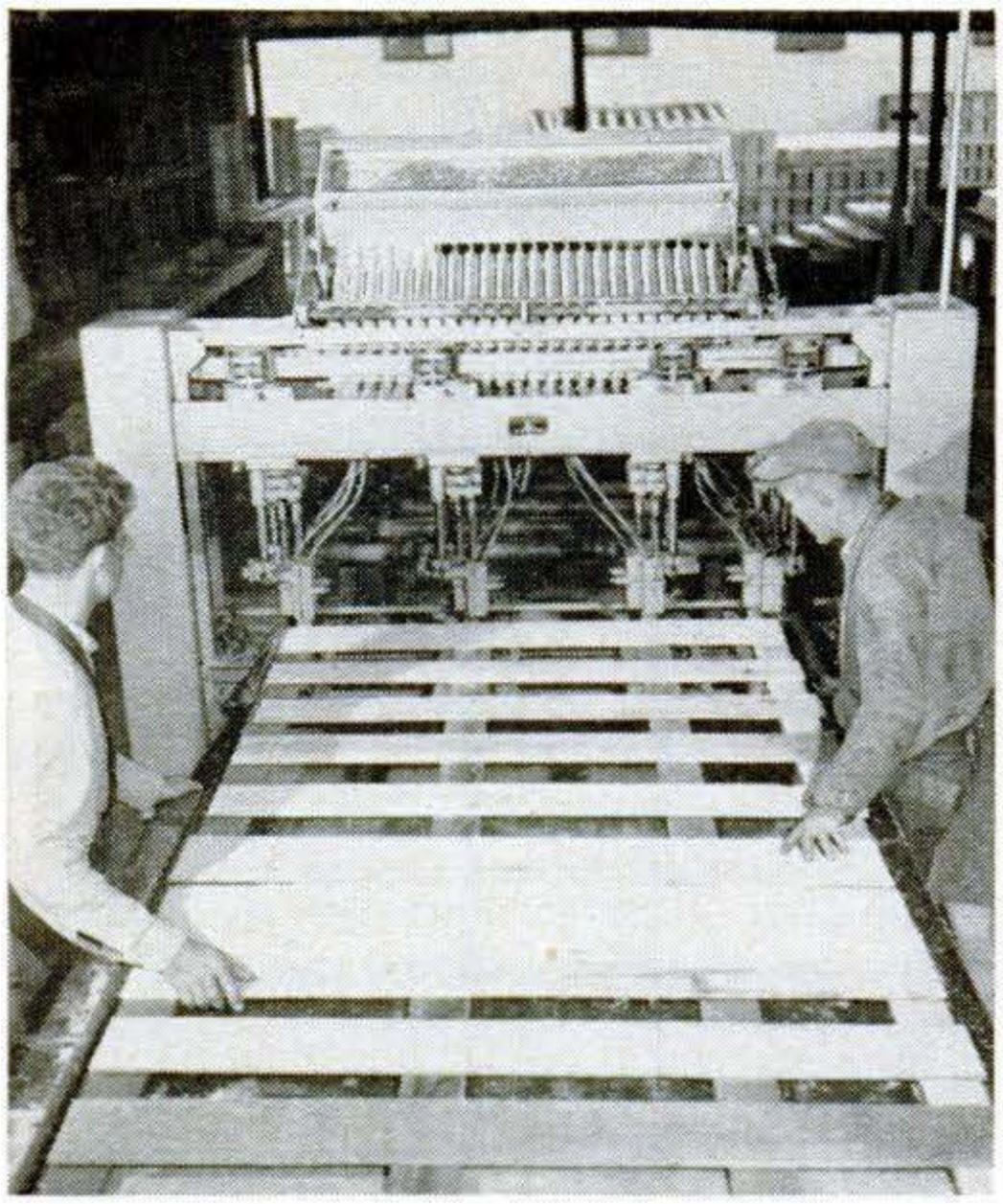


X-Ray Tube Wobbles. To multiply the output of an X-ray tube without overheating the target plate inside, A. I. Berman, Stanford graduate student, devised the method shown above. A coil, right, develops a rotating magnetic field that swings the electron beam within the tube over the target plate, distributing the heat. An external motor gyrates the tube in synchronism, thus keeping the X rays at a fixed point of focus.



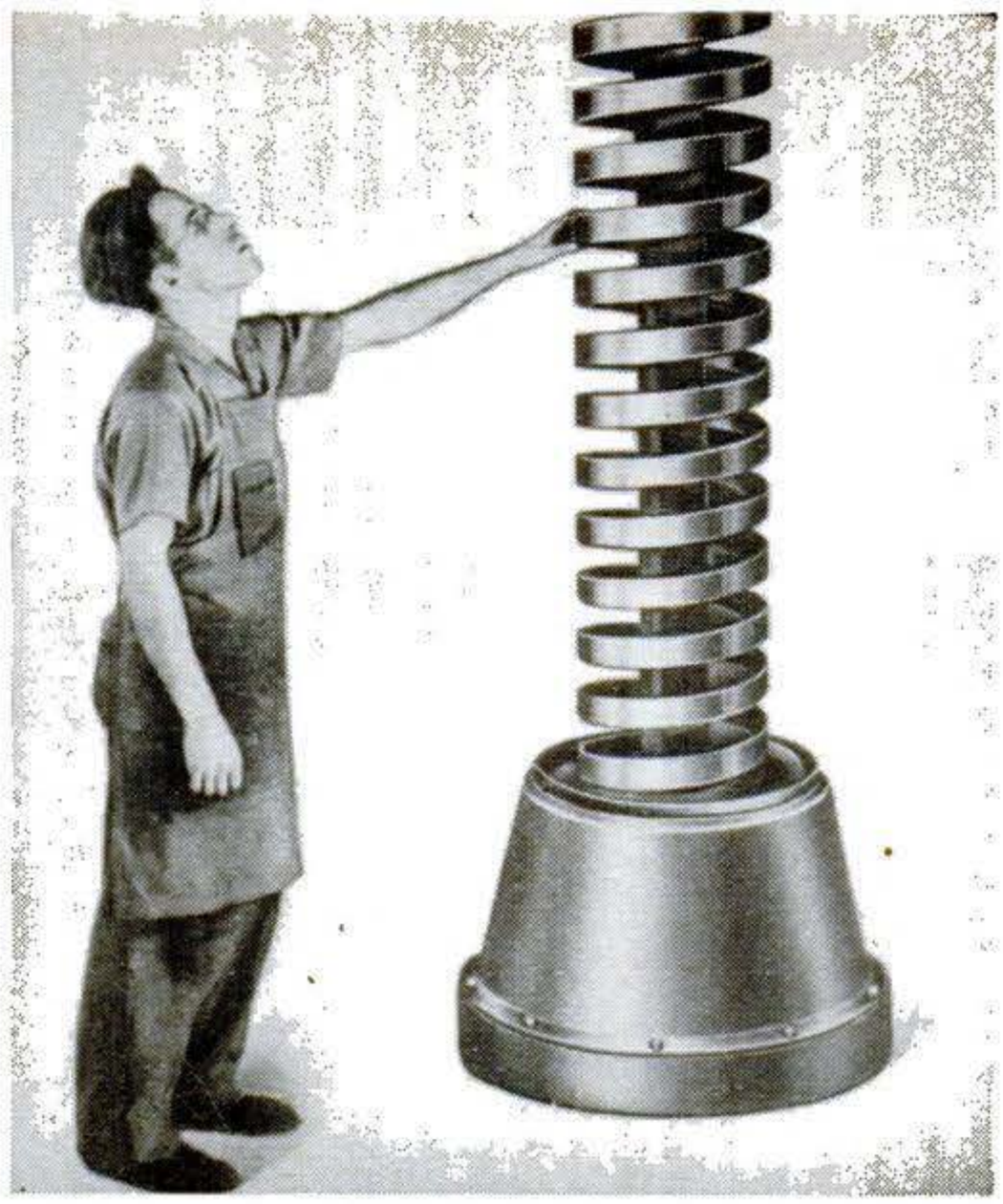
Electricity Pictured. Nearest thing to a portrait of an electric current, General Electric experts say, is this three-dimensional model of a simulated lightning stroke flowing through a copper coil. It is made of photos from oscillograph readings of the winding, mounted on fiber board. Height measures voltage peaks and valleys; width represents time; and distance lengthwise traces location of impulse in coil.

Copyrighted material



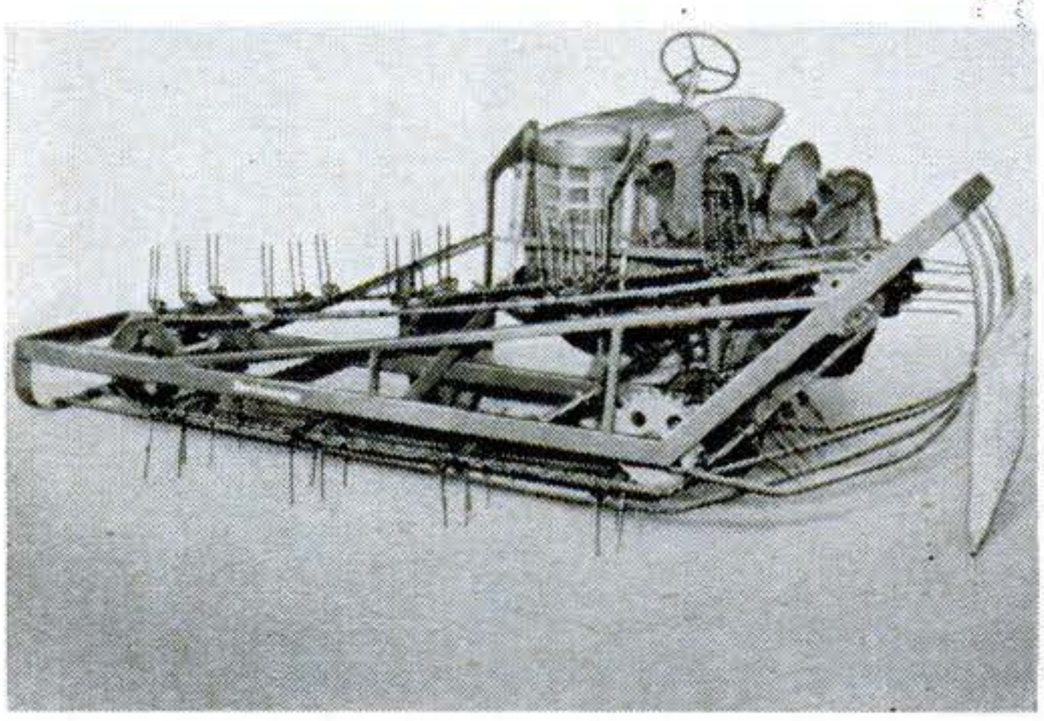
Multiple Hammer Nails Crates

A MACHINE that stands 8 ft. high, weighs more than a ton, and has a 5-hp. motor is a lot of equipment just to hammer nails—but it can drive and clinch 24 at a time. It can turn out a completed crate section like the one above, which is 52 in. by 140 in., every 40 seconds. Food Machinery and Chemical Corp., Riverside, Calif., makes the hammer.



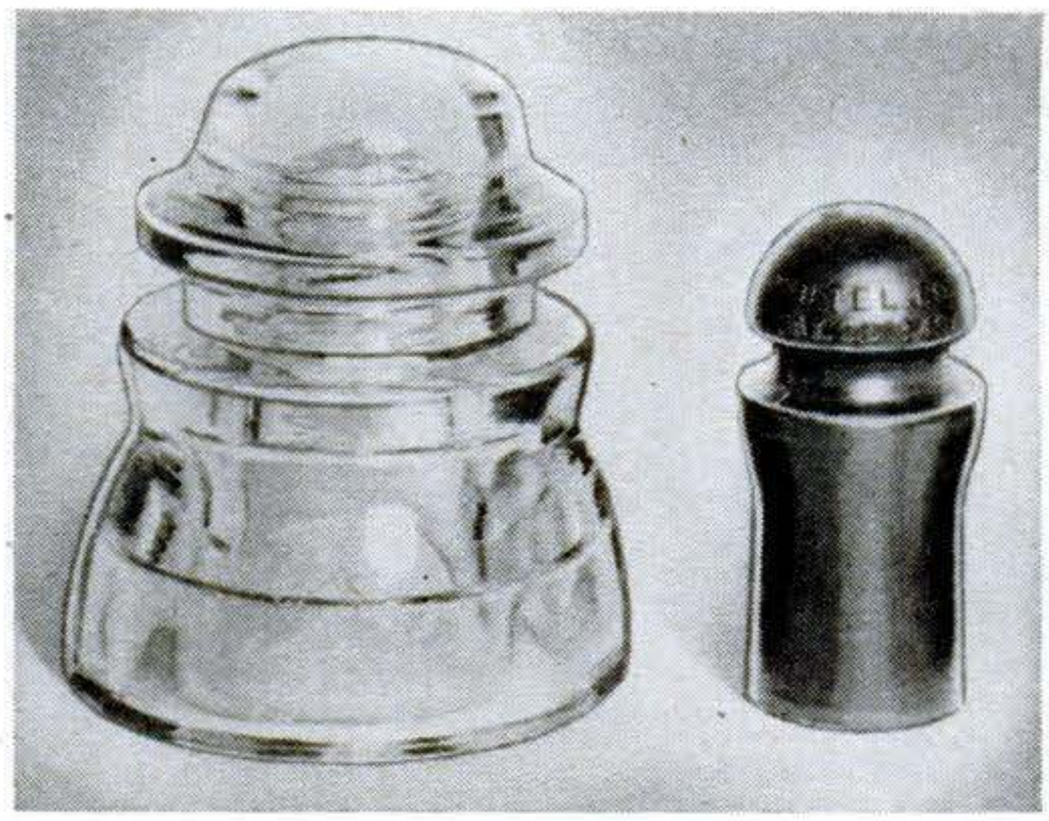
Materials Wriggle Uphill

LOOSE materials actually flow uphill on a new factory device that handles powders and small articles. High-speed vibration does the trick, making the material inch its way up the spiral ramp. The spiral does not turn, but is simply shaken by an electromagnetic drive. Syntron Co., of Homer City, Pa., makes the vibrating feeder.



Tractor Rake Aids Haying

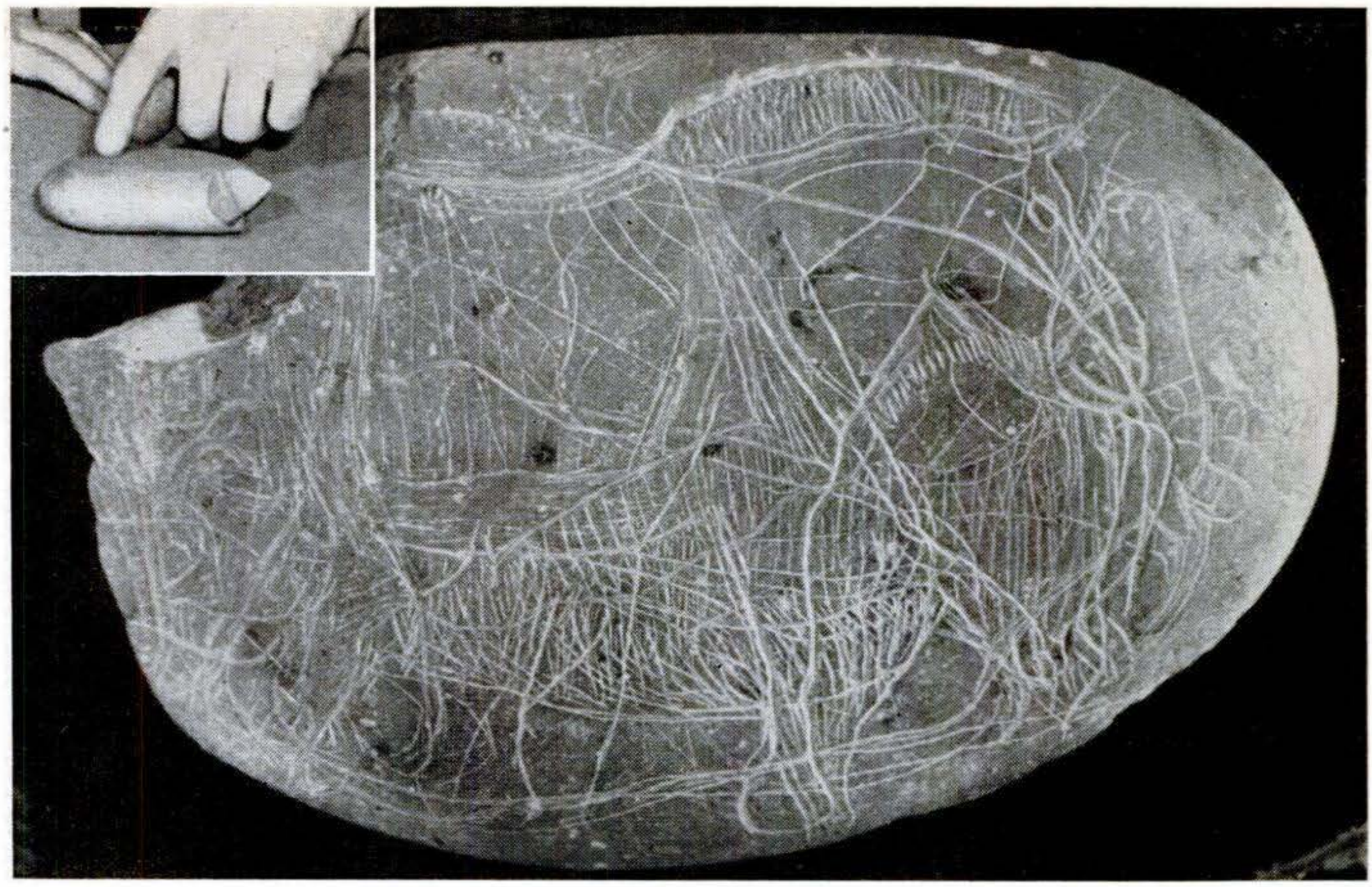
THIS new tractor rake that handles all kinds of crops quickly and cleanly also reduces damage to plants often caused by the tractor itself. Used with hay, it produces windrows that are loose and fluffy, thus helping to preserve the color. Made by Earthmaster Farm Equipment, Burbank, Calif., it mounts on the tractor's front.



New Insulator Is Boy-Proof

WESTERN UNION has finally gotten even with small boys. After long years of patiently replacing the glass telegraph-pole insulators (left) that the boys used for target practice, the wire company has developed a rubber insulator (right) that won't break. Extremely light, it is hard enough to do its job, but soft enough to let bullets and stones bounce off.

Copyrighted material



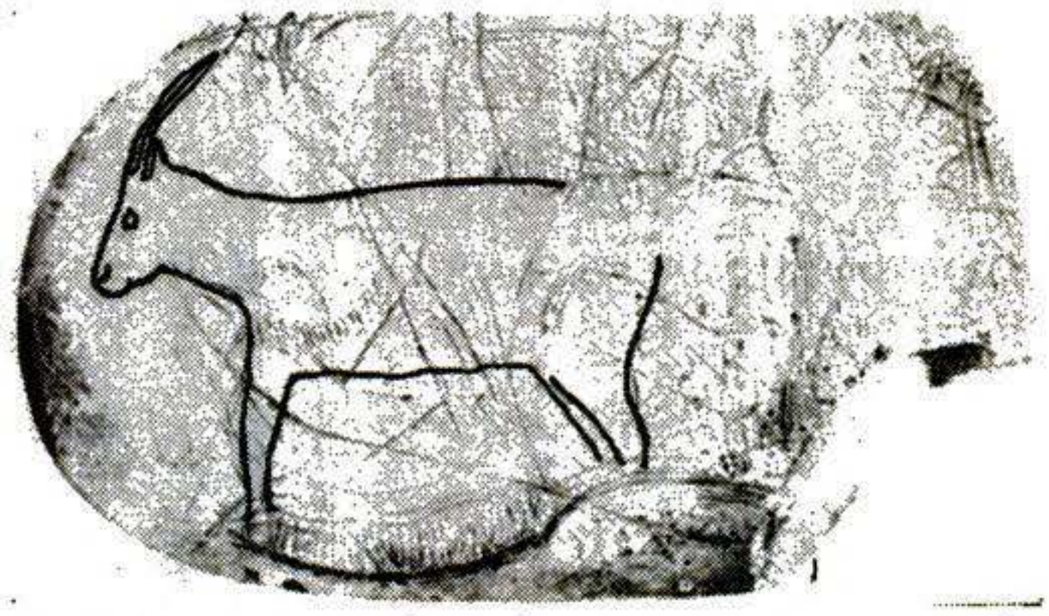
"La Colombiere Pebble" shown in inset and close-up photos depicts animals of prehistoric era in ancient carvings drawn on top of each other. Drawing of horse is most plainly seen.

Zoo Found Engraved On Pebble

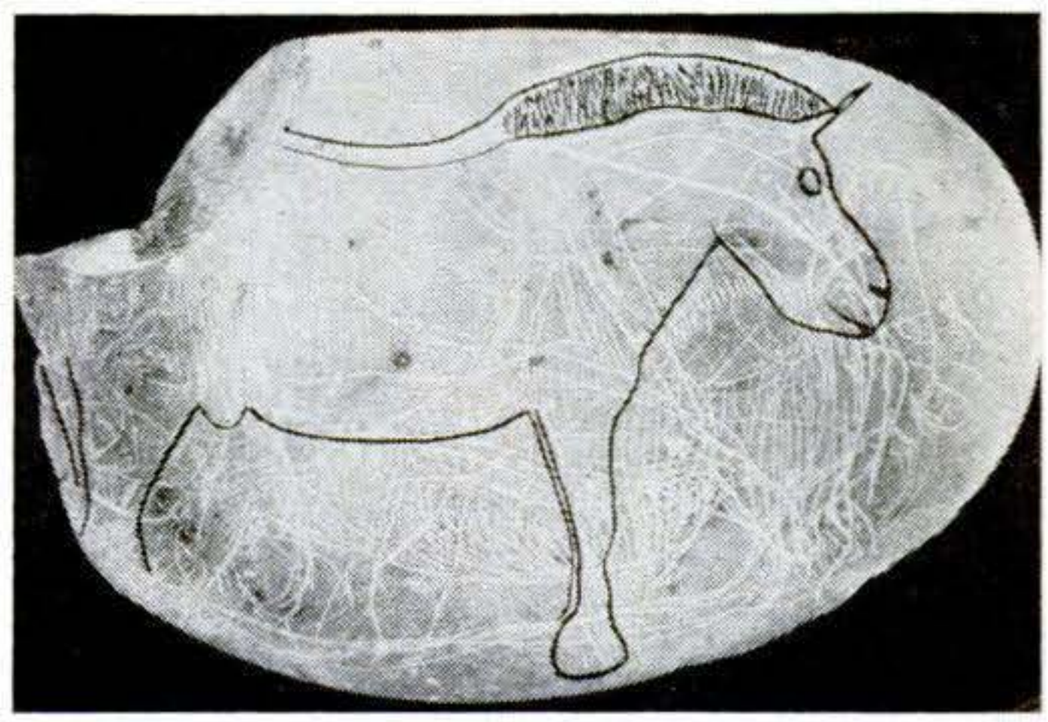
CARVED one on top of another, nearly a dozen wild beasts adorn a pebble about the size of a large potato, shown here. Called one of the finest engravings of its kind ever brought to light, the strange work of art was discovered last summer by Dr. Hallam L. Movius, Jr., Harvard University archaeologist, while excavating a hunting-camp site at La Colombiere in eastern France.

As Dr. Movius pieces together the pebble's story, it served the huntsmen as a good-luck charm. Before they set forth upon the chase, one of them carved on the pebble the likeness of the animal they hoped to bag. Evidently good fortune bolstered their faith in the "lucky" stone, and their artist frequently revised it to suit the occasion, with pictures that include a bison, horse, ibex, rhinoceros, and deer—all prehistoric.

For this happened, Dr. Movius figures, some 20,000 to 25,000 years ago. END



Artist's picture of an ibex is seen on same side of the pebble as the horse, when the stone is turned opposite way. Engraved outline has been filled in with black ink to make it stand out.



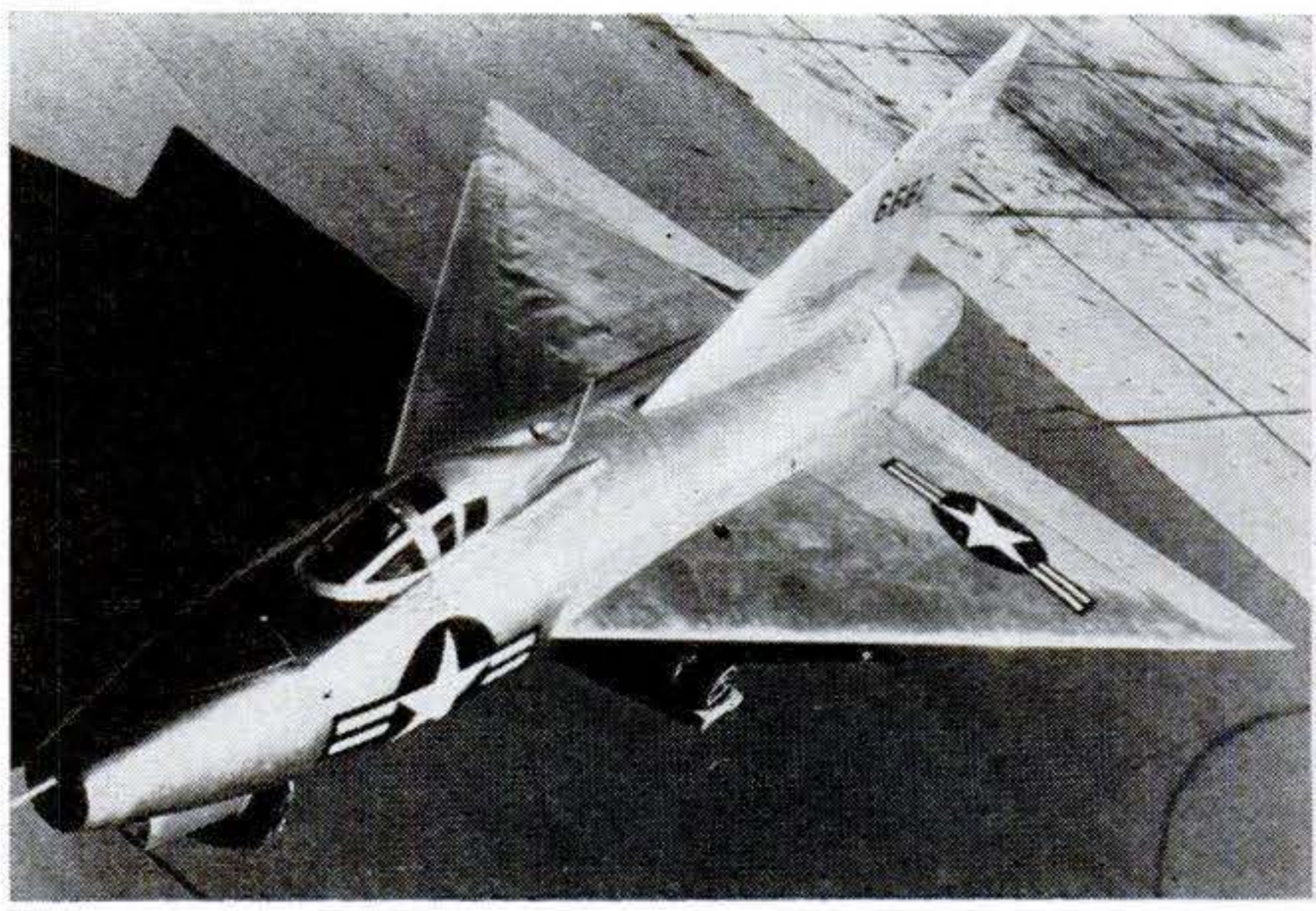
Ink treatment of outline of horse also gives better view of Stone-Age artist's handiwork. Pebble is believed to have served owners as a good-luck charm on prehistoric hunting trips.

Copyrighted material

What's New in Aviation

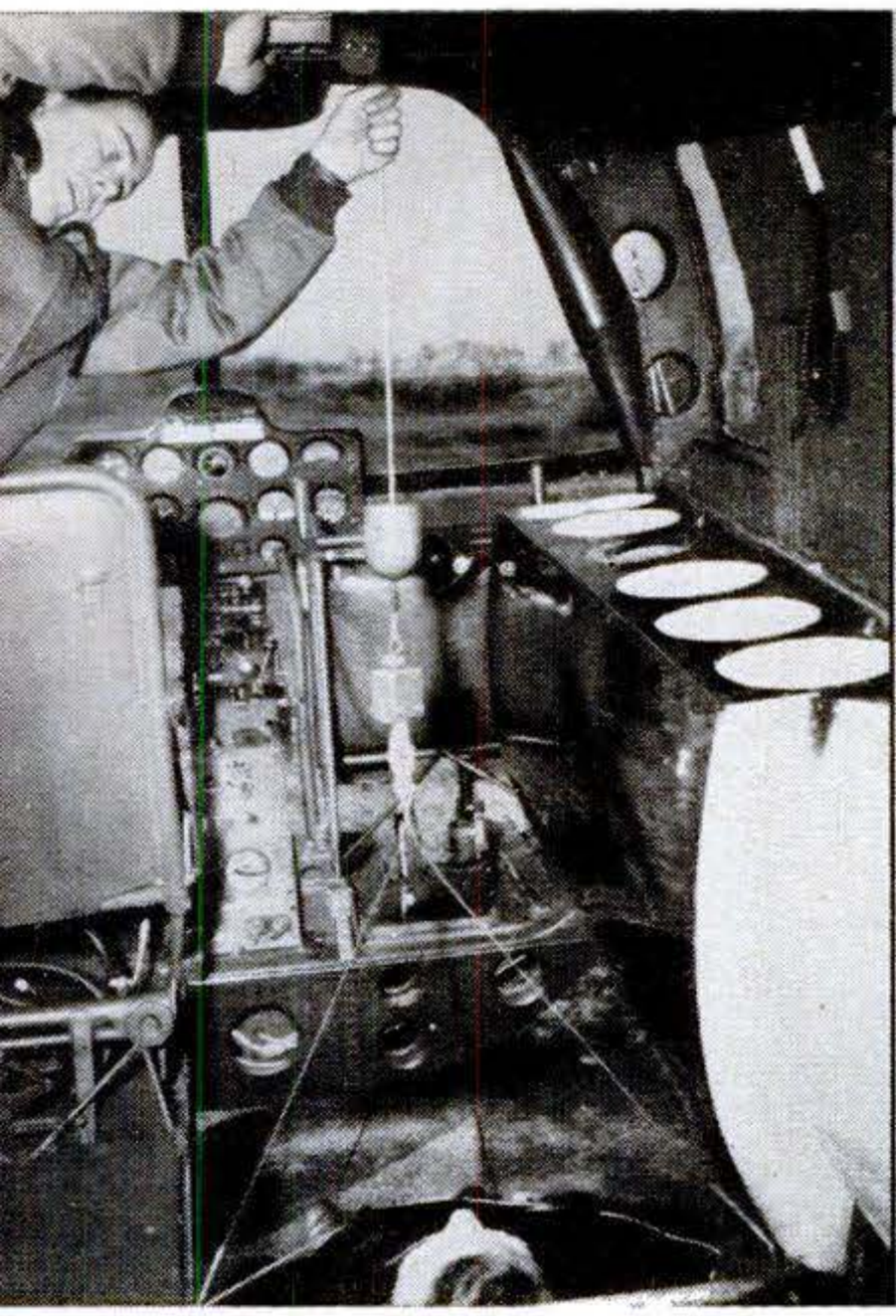
Fuselage Flaps Flip. Diving in formation, these Navy AD Skyraiders, with all stops out, show what they have in the way of braking equipment. In a vertical dive at 500 m.p.h., the doorlike fuselage flaps will reduce speed by about 200 m.p.h. The array of brakes comes in handy both in combat maneuvers and in a diving approach on a target. Some 18 separate versions of the Douglas-built bomber are projected or in service. Skyraiders, now operational, carry a bomb-rocket load three times heavier than when the airplane was first introduced. One version, designed for tactical ground support, carries rockets, from five-inchers to 1,200-lb. Tiny Tims.

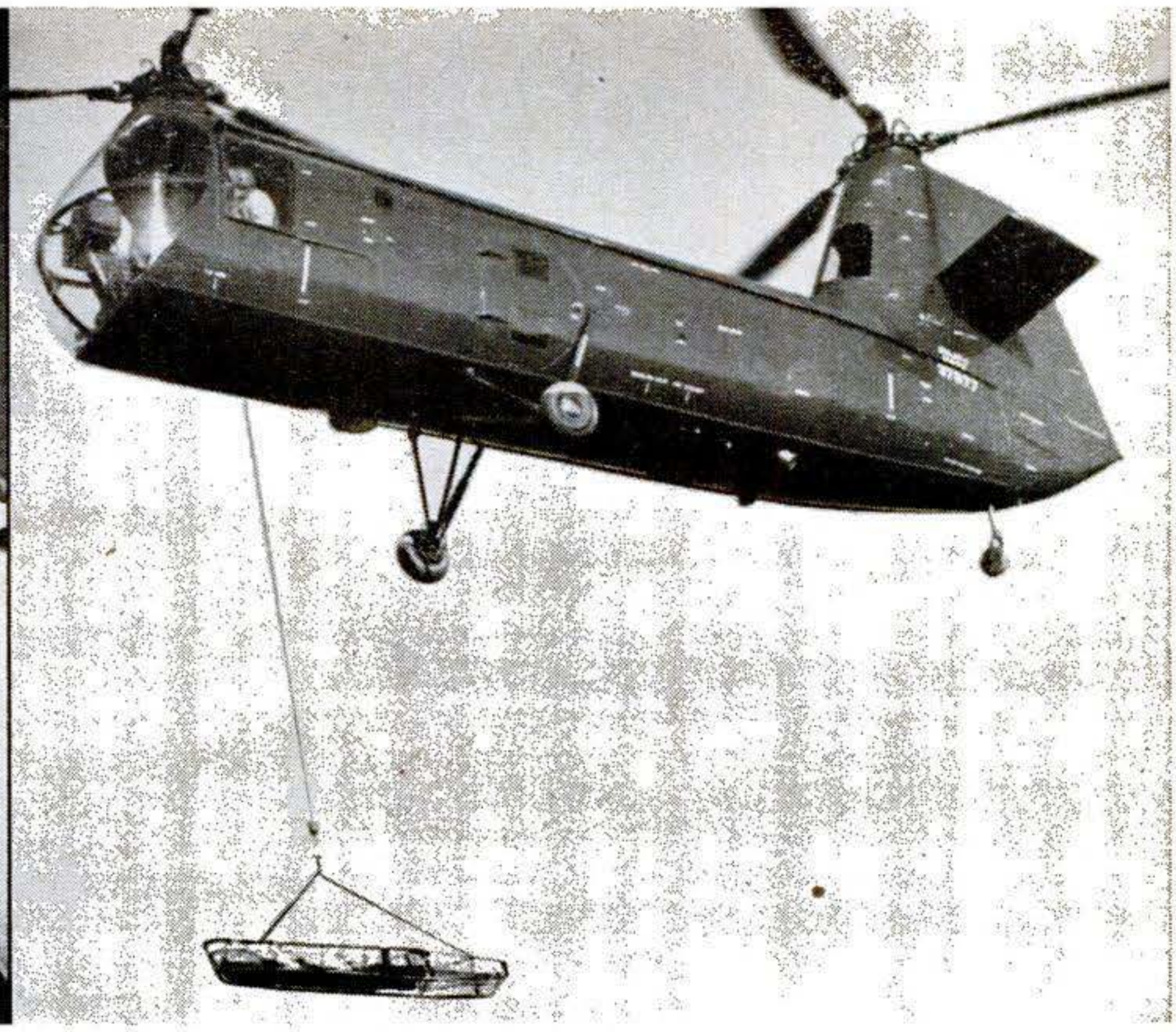
Loading a Heavyweight. Into the bomb bay of the giant B-36 Convair six-engine bomber goes a 42,000-pounder. Two of these bombs were carried on a recent mission and dropped on the Muroc Air Force Base bombing range in California. This 42-ton bomb load is claimed to be the heaviest ever carried by one plane.



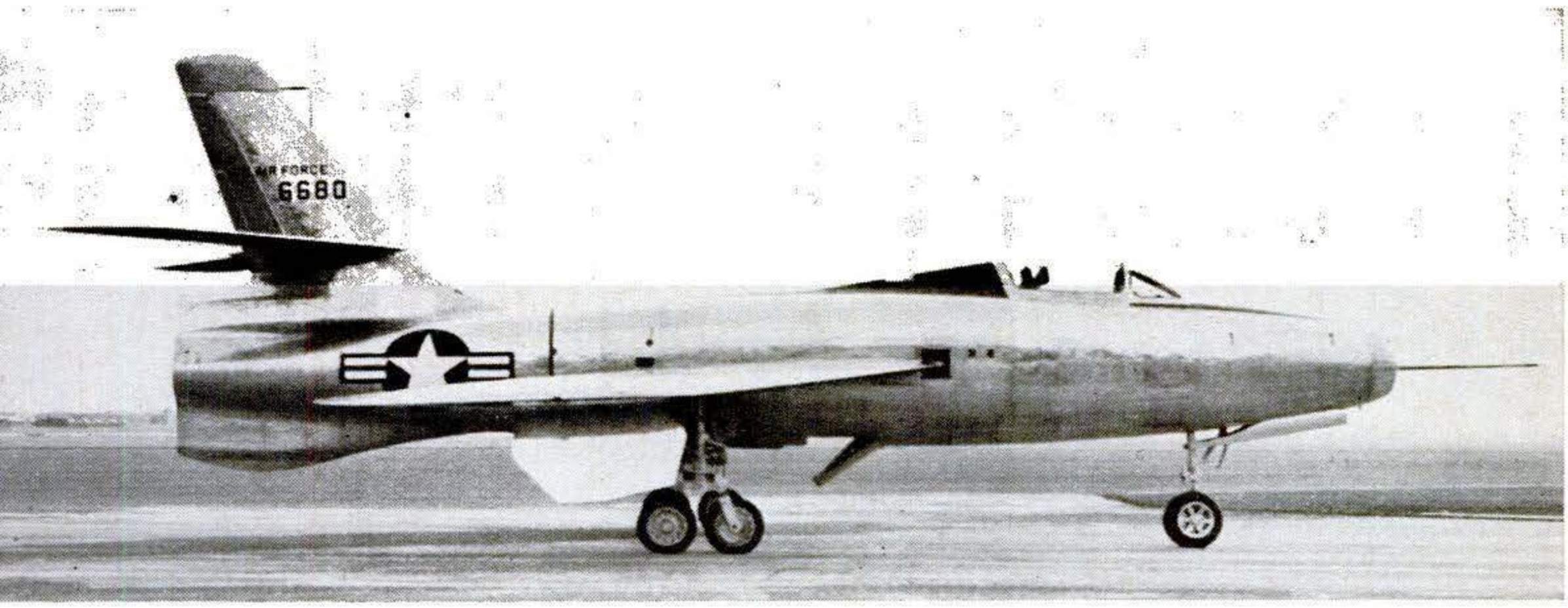
Air Force Adopts Arrowhead. With a 60° sweptback wing, the flying triangle shown above is the USAF's newest jet-powered research plane. The Model 7002, designed by Consolidated Vultee to test flying characteristics of the Delta Wing, has proved its efficiency in wind-tunnel tests at transonic and supersonic speeds.

Copyrighted material





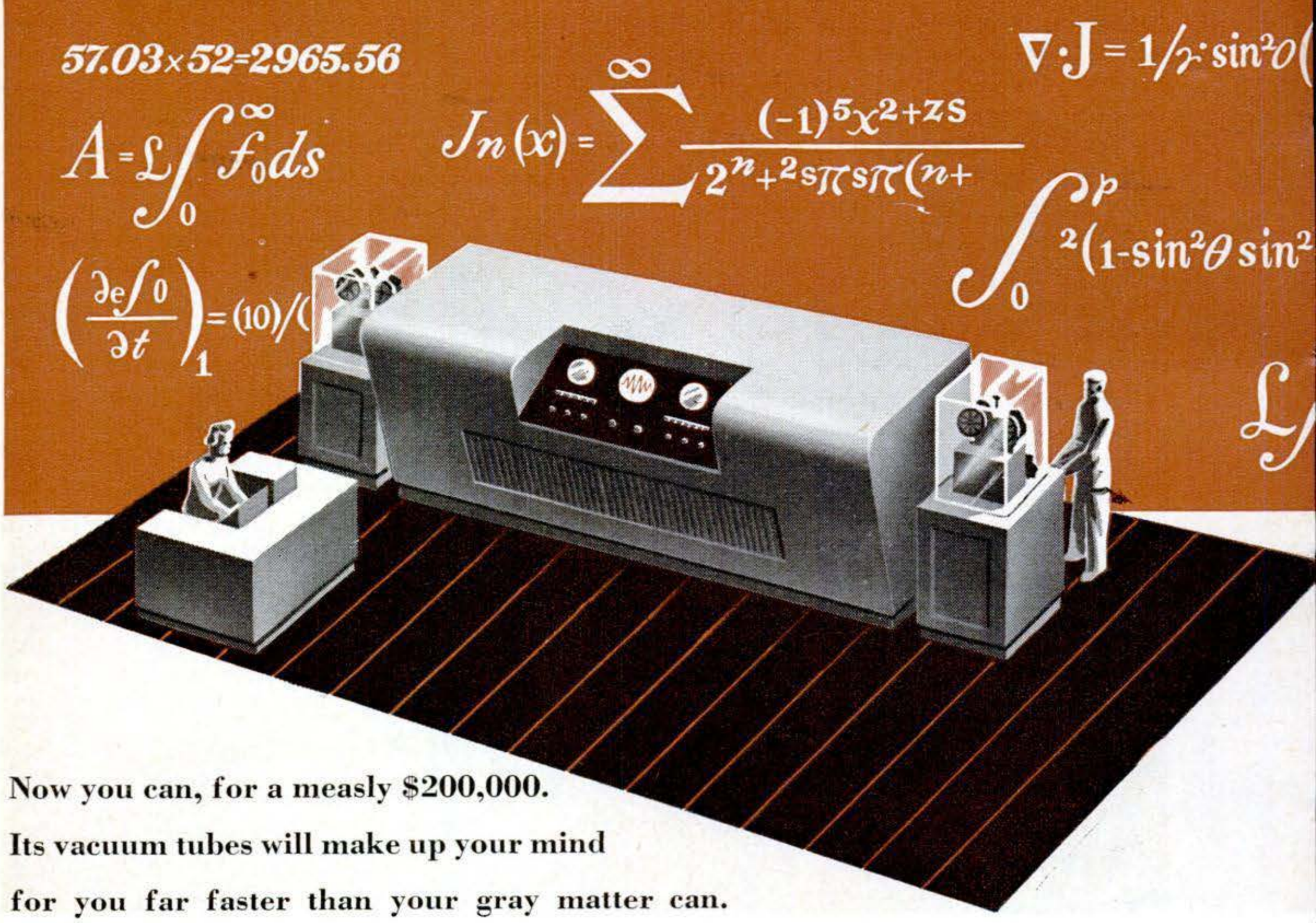
'Copter Cuts Capers. Probably the first helicopter to perform a loop (inadvertently during a test flight), the Navy's new Piasecki XHJP-1, is designed for more serious assignments with the fleet. Hauling a litter patient aloft, as shown at right above during a simulated rescue mission, is one of its jobs. A hydraulically operated hoist, as shown at left, permits the litter to be brought directly into the cabin. The 'copter will also serve as a ship-to-ship and ship-to-shore personnel transport. With the blades folded, the XHJP-1 can be lowered even on the comparatively small aircraft elevator of a cruiser. The craft will carry five passengers or three litter patients.



Defense in the Air. This may be the Air Force's answer to any enemy bombers or missiles that may try to hit the U. S. homeland in a surprise attack. It is Republic's new XF-91 jet-powered interceptor-fighter, reputed to have a top speed equal to that of sound. Four rocket motors, mounted at the extreme tail of the plane, will give added power for take-offs and climbs and high-speed acceleration for high-altitude combat. Note the sweptback wing and horizontal and vertical tail surfaces. Landing gear consists of two wheels in tandem under each wing plus a conventional nose gear. Engine probably will be a GE J-47 with over 5,000 pounds' thrust.

Copyrighted material

Want to Buy a Brain?



Now you can, for a measly $200,000.

Its vacuum tubes will make up your mind

for you far faster than your gray matter can.

By Martin Mann

PS photos by Hubert Luckett

YOU can buy a machine now to do some of your thinking for you. It will give a definite answer to any question that can be expressed mathematically.

Ask one of these machines how thick the cables for a new bridge should be, and it will tell you.

Ask how fast a new automobile can go before its crankshaft starts to vibrate to pieces, and it will give the exact speed.

You can order one of these electronic brains from a number of organizations. They are being made by the Eckert-Mauchly Computer Corp., Raytheon Mfg. Co., Harvard, M.I.T., the University of Pennsylvania, and jointly by RCA and the Institute of Advanced Study.

One of the most versatile of the new machines will be the Univac® (for UNIVersal Automatic Computer), now under construction by Eckert-Mauchly. It will be much smaller than older computers, but will still take as much room as almost 70 people standing together. It will have 1,500 vacuum tubes and 12 seven-inch reels of magnetic tape. It will be able to multiply 10-digit numbers 30,000 times a minute, and solve hundreds of equations containing hundreds of unknown numbers all at one

Copyrighted material

time. It will work 6,000 times faster than a man with a desk adding machine. It will cost $200,000, somewhat less than Eniac's $400,000 (PS, April '46, p. 83) and the Harvard Mark I's $250,000 (PS, Oct. '44, p. 86).

The newest thinking machines have speeded up their counting by replacing the relays of older types with vacuum tubes, which also act as switches but work much faster. They also have bigger, quicker memories, and faster equipment for putting information in and getting answers out. By counting so fast, they are able to think. They can compute quickly enough to find an answer by logical mathematics, where the human brain, too slow to figure the problem out exactly, must rely on judgment.

Aeronautical engineers, for example, know how to calculate a plane of desired characteristics. And they do some of the figuring. But in the end, they give up the mathematics, make a good guess, and build a model. One model of a bomber might cost $30,000,000—and it could crash on the first flight. An electronic computer could portray the flight of a planned airplane *before it was even built,* possibly eliminating the need of any experimental models.

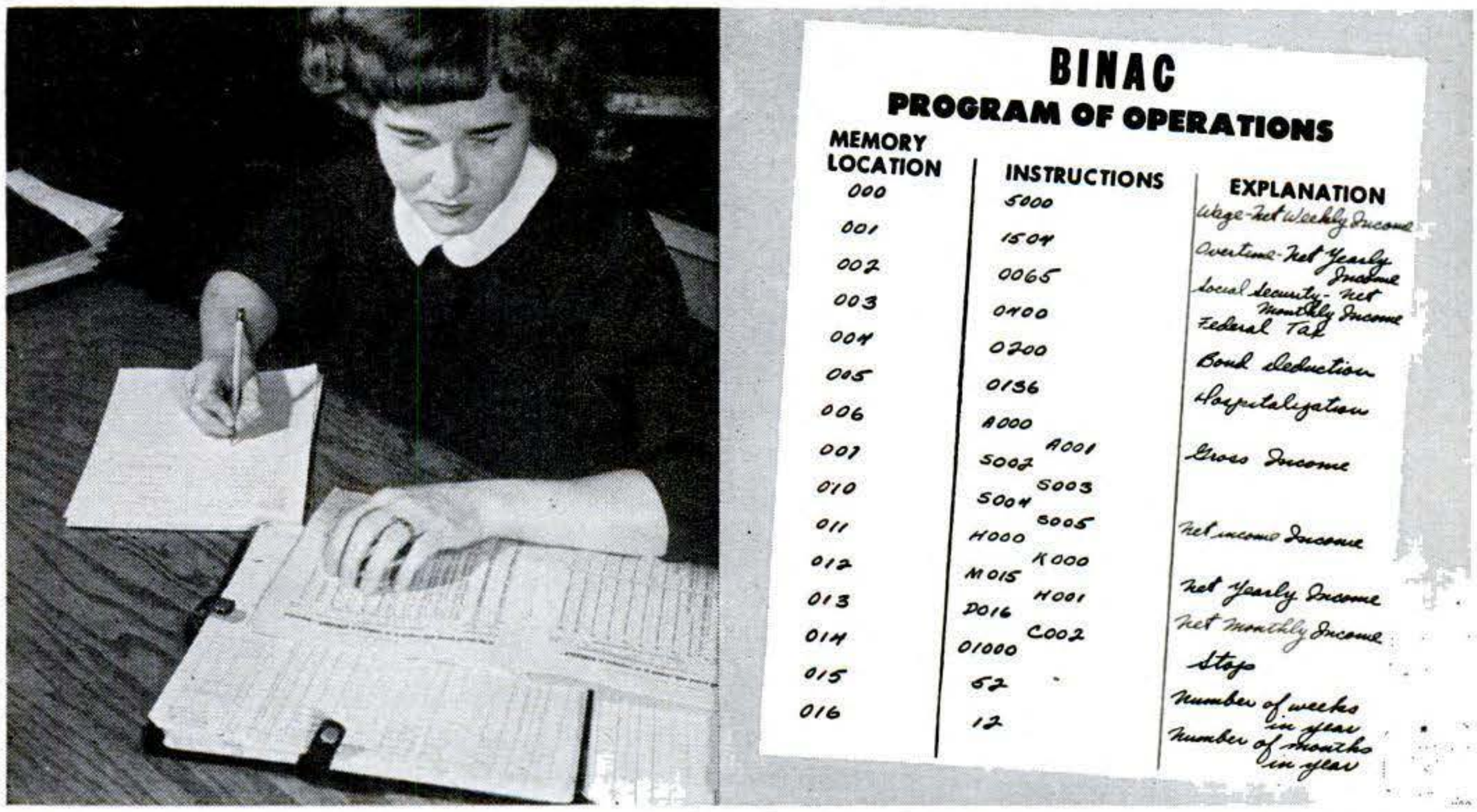
The first Univac, however, will tackle a less-dramatic job than flight-testing an airplane still unbuilt. The number-one Univac is being made for the Census Bureau, which will use it to compile useful information scattered through the millions of individual cards made up by the census takers.

Univac will be able to do this easily and quickly. All the information on all people—expressed as code numbers—would be run through Univac. The machine would classify the codes any way it was told to. Machines that feel holes in cards now do this, but they work comparatively slowly.

Four other Univacs are already on order. The Army Map Service wants one to change surveys from one system to another. The Air Comptroller wants one to compute the most economical way of handling supplies. And an insurance company and a market research organization have each ordered one to calculate their own statistics.

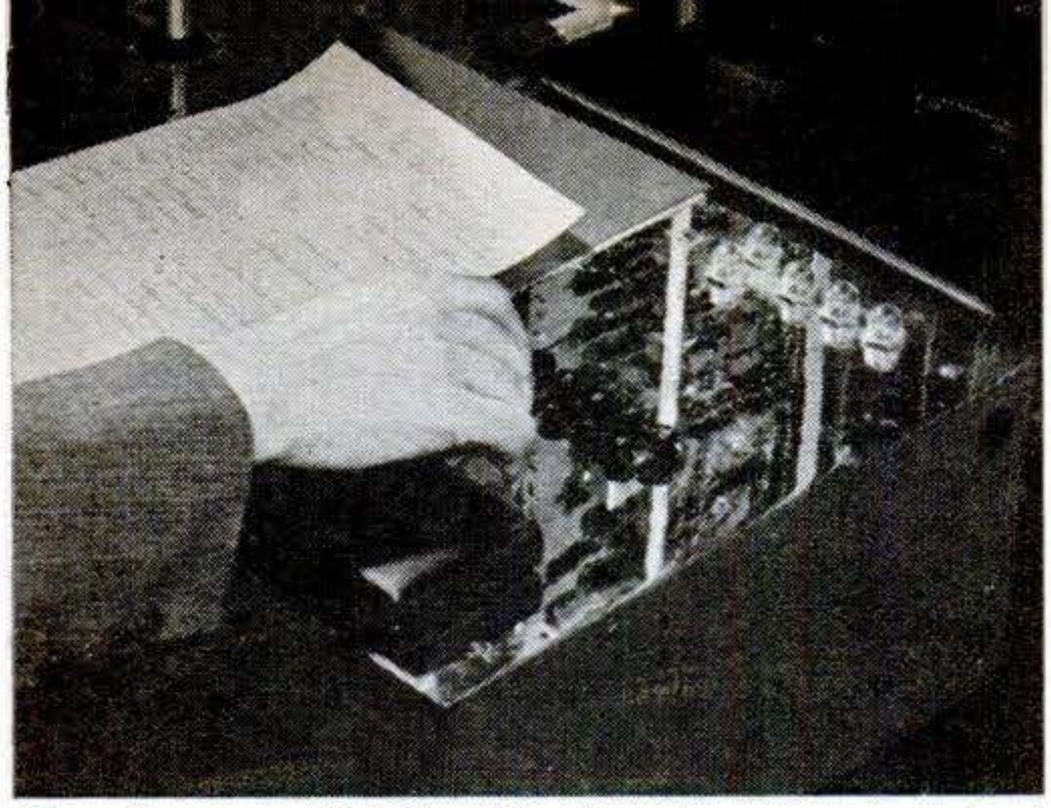
How do they work? Like children, these man-made office workers will count on their "fingers" (i.e., vacuum tubes) to add. They will count backward to subtract, and count repeatedly to multiply or divide.

Many primitive people count by two's (called a binary system), rather than by ten's. So will Univac. But decimal problems will be fed into it and decimal numbers will come out. Leaping from our decimal system to a two-number system and back again is

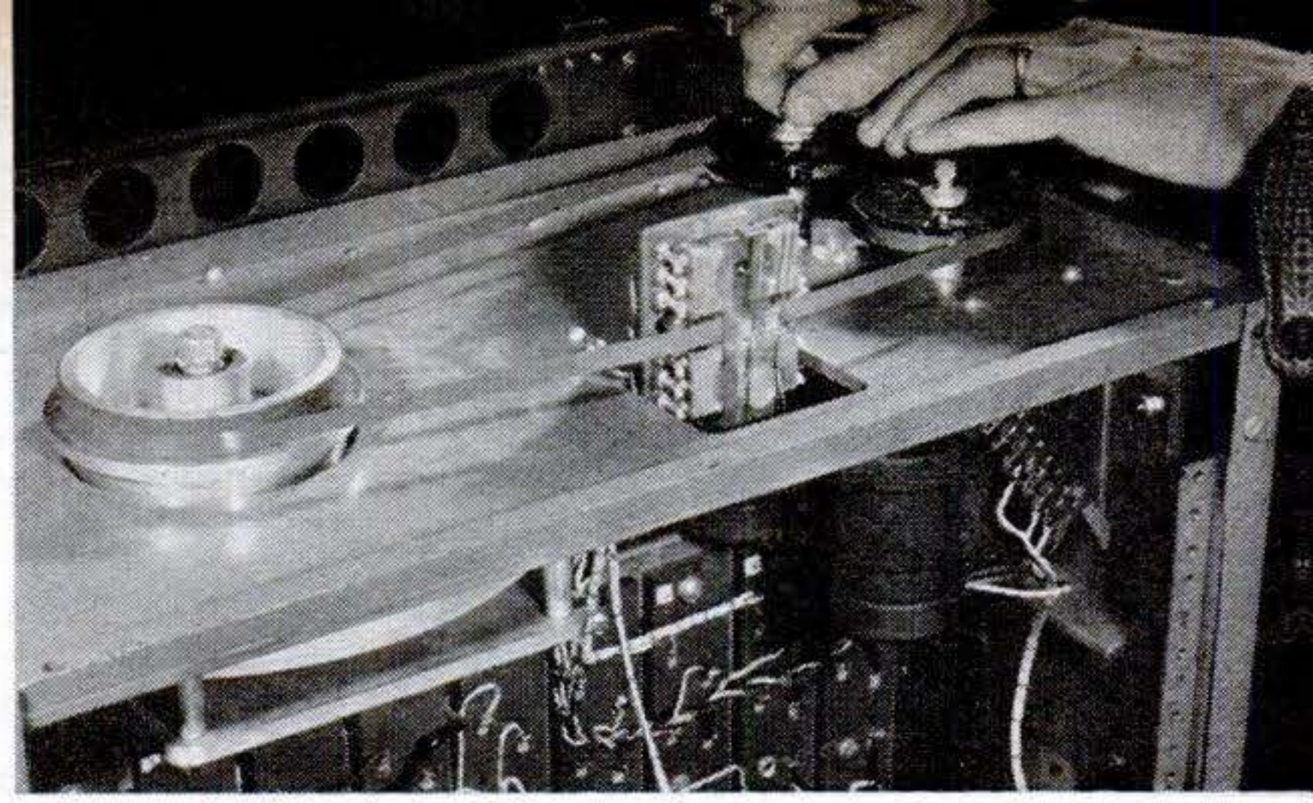


Electronic computers can figure out hundreds of pay checks faster than the abacus did one for John Doe (PS, Aug. '48, p. 86). To show you how one works, mathematician Jean Bartik prepares the "program" that will present John Doe's pay check question to Binac®, the kid brother of Univac®. Binac needs this instruction sheet, or "program," to tell it how to find John Doe's weekly, monthly, and annual pay. The left column is an index, showing the machine where to look in its memory for a number or order. Next column gives numbers and orders.

Copyrighted material



The figures of John Doe's salary are punched on this keyboard and fed directly to the machine. Instructions and numbers referring to any like problem are also punched here, but fed to a magnetic tape for use with any employee's salary. Note that keyboard goes only to 7, since Binac must be given numbers in octal (8-number) instead of decimal (10-number) system.



This magnetic tape now holds basic figures and numbers for use with any pay-check problem. It feeds them to the computing part of Binac at the rate of about 1,000 per second. It also serves as an extra memory, storing intermediate information that will be needed later in the computation. Information can be held as long as needed, or erased to make room for new data.

really quite simple. Suppose, for instance, that you use 0 and X as your two numerals. Then let 0000 represent zero, 000X represent one, 00X0 represent two, and so on. Univac will do its computing by handling numbers in this way.

The reason binary numbers must be used is that a single vacuum-tube switch cannot represent 10 different conditions, but only two: it can be either on or off. If the tube is on, it represents the binary numeral X; off, it represents 0.

The tubes count by turning on or off in the proper sequence. They do this in response to a five-part electric signal, similar to telegraph code, that represents the number in binary numerals. The signal is made up of pulses and no pulses (blank spaces). The pulse corresponds to the binary numeral X, the blank space to 0. Thus the number two (00X0) would be blank, blank, pulse, blank. An additional pulse or blank space is also added to the signal as a check against mistakes.

In Univac, these code groups are handled by "adder" units made up of "gate" tubes arranged in "and" and "or" circuits. The "adder" adds two numbers (each having four digits, remember) by taking the digits in pairs, one from each number. This is the same way you add big numbers. Thus, to add three (00XX) and six (0XX0), the adder first gets the sum of X and 0, then X and X, and so on (for an example—simplified slightly from the system actually used—see page 152).

Even the fanciest mathematical problems are done this way, since differentiation, integration, or any other complex calculation can be reduced to simple arithmetic. Only one small set of vacuum tubes will be used for actual computation, and it will perform only a single operation at a time. It will work so fast, however, that the rest of the machine will have trouble keeping up.

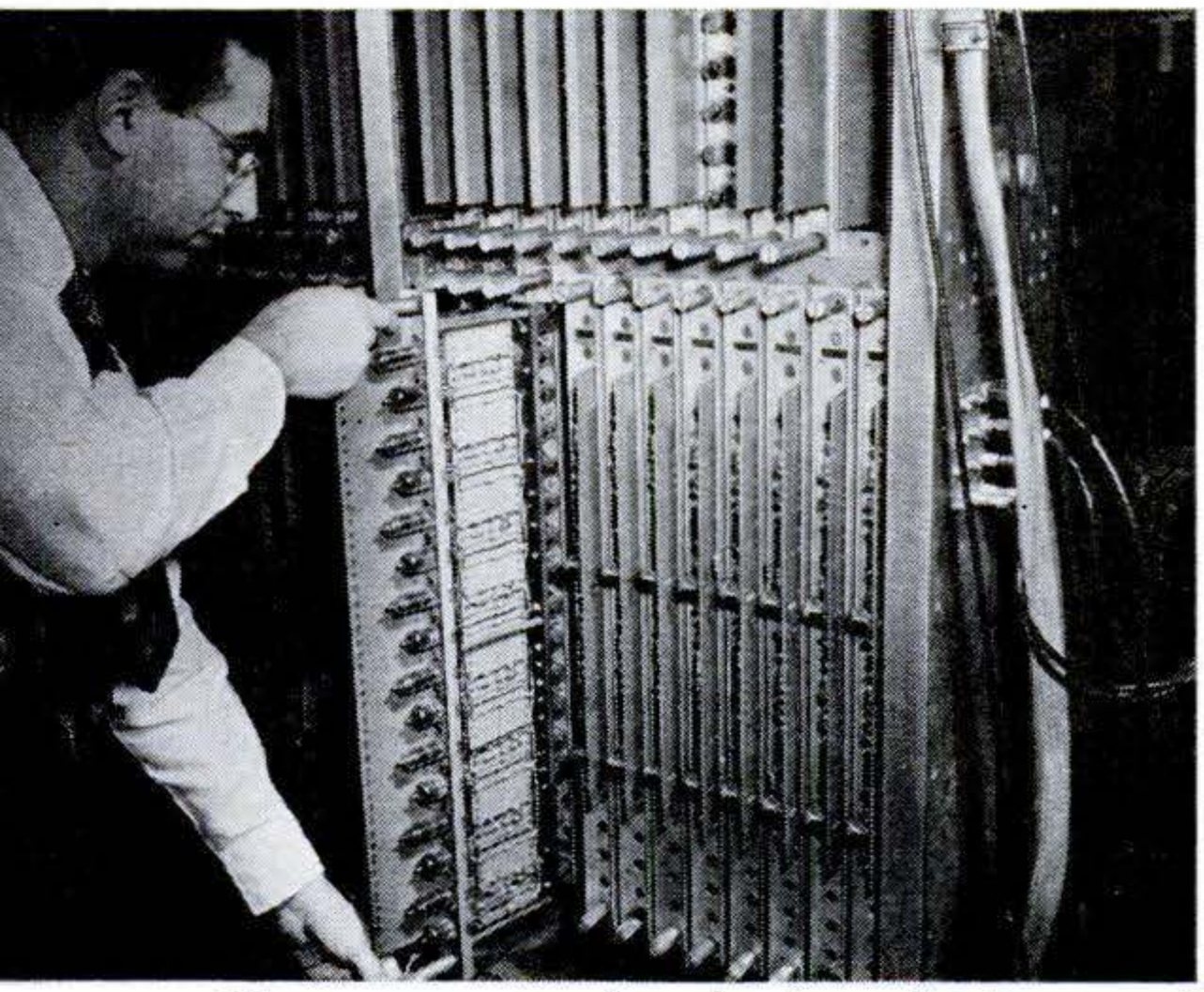
The signals giving Univac its figures and instructions will come from a typewriter-like keyboard. Since the machine must keep some of them in mind, the way you do when you work a problem, it has a memory.

And like you, it really has two kinds of memory. One kind is high-speed, for remembering things that will be used quickly and then forgotten, the way you carry figures in your head when adding. Univac's high-speed memory will be a tank of liquid mercury metal—the stuff used in good thermometers—that stores up the numbers. Signals representing numbers will travel to a quartz crystal at one end of the mercury tank. The crystal will vibrate, creating a sound signal in the mercury duplicating the electric signal. A second crystal at the other end of the tank will pick up the sound signal, convert it back into electricity, and send it around to the first crystal again. Since sound travels much slower than electricity, many signals (i.e., numbers) can be kept circling through the tank indefinitely, and any one can be picked out of the electrical part of the circle whenever needed.

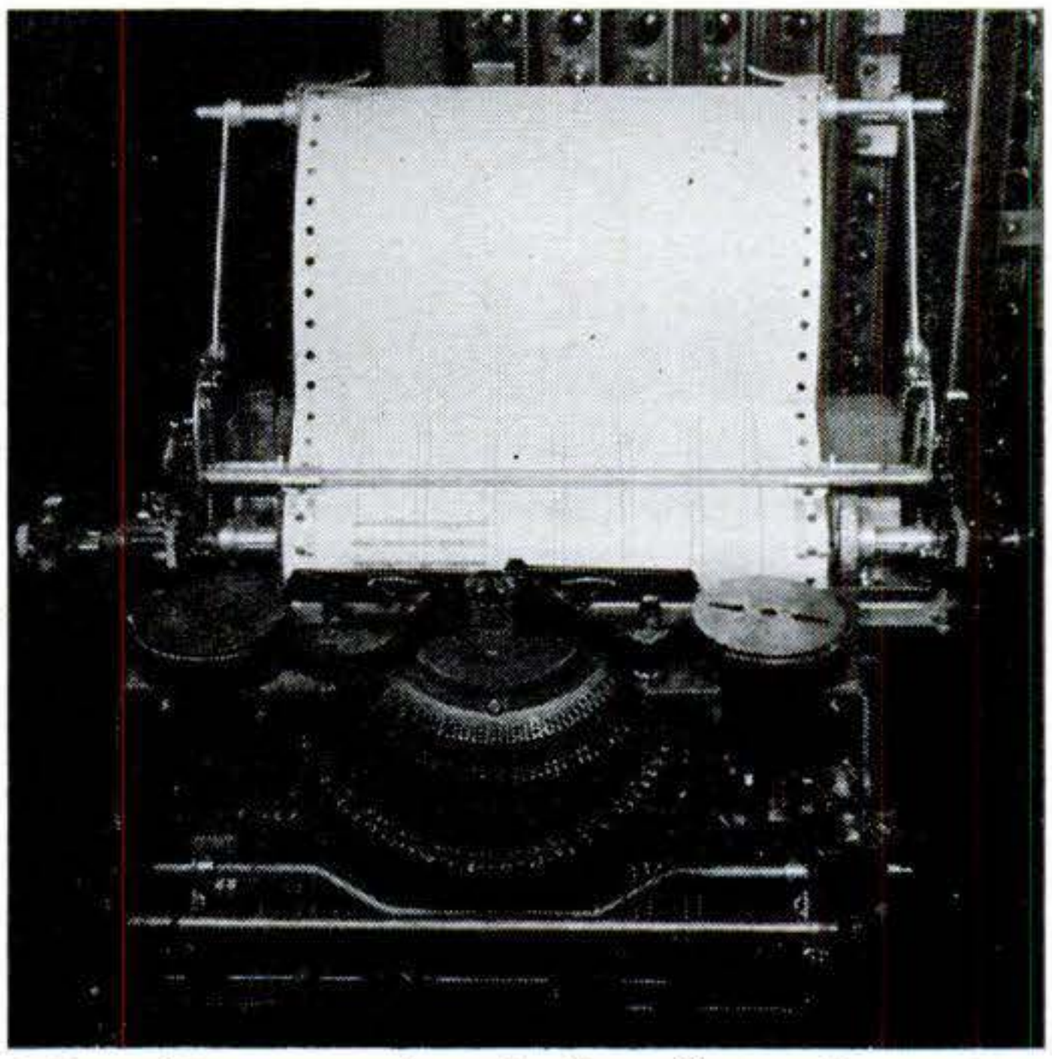
Univac has a slow memory, too—something like a scratch pad for noting intermediate results. Univac's scratch-pad memory will be a magnetic-tape recorder. Figures

Copyrighted material

Before Binac does any actual figuring on John Doe's pay check, it sends all information to the memory—a tank of mercury in which the signals circulate until needed. Circular end-plate that closes mercury column is visible at far right. Binac has 16 memory circuits, each kept moving through mercury by its own set of vacuum tubes (sticking out like spokes in center of photo).



These vacuum tubes do the multiplication of John Doe's weekly pay of $57.03 by 52 to get his annual pay. They do this by counting to 5703 52 times. Addition is simply two counting operations, and subtraction and division are done by counting forward, then backward. Even the most complex problems are solved this way.



When Binac reaches the "stop" signal, it prints the answer John Doe wants, but in octal figures. Converted to the decimal system, they say that he earns $57.03 a week, $2,965.56 a year, and $247.13 a month. An extra numeral is added as a spacer to separate the "words"—groups of numbers the machine handles together.

Copyrighted material

How Univac Adds by Two's on "Gate" Vacuum Tubes

To Univac, numbers are a binary code of electrical pulses and blank spaces (no pulses). Typical code, simplified slightly from Univac's, is shown below (X means pulse, and 0 means blank space).

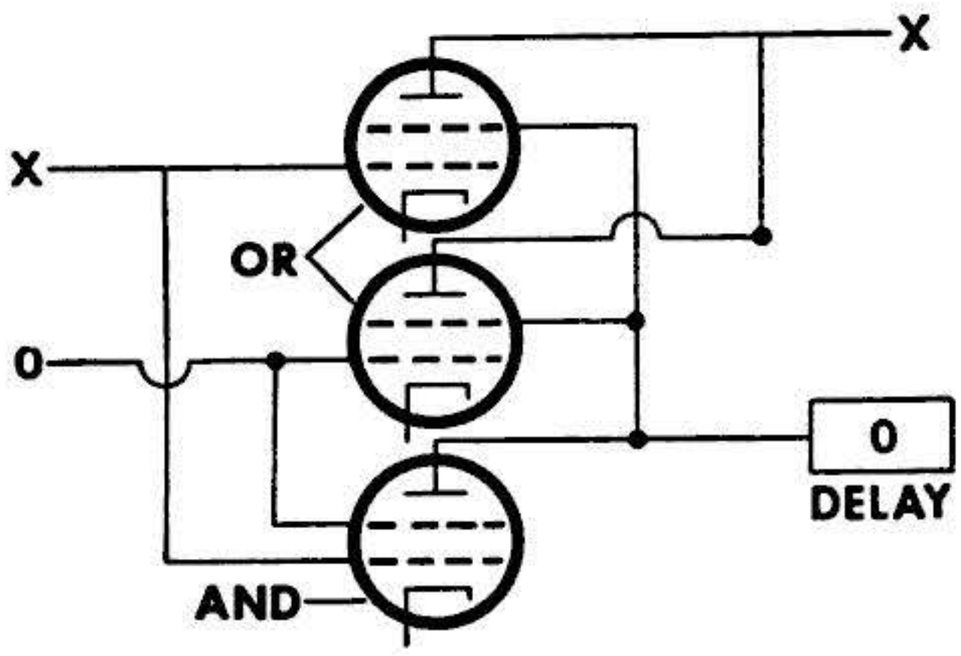
0=0000	5=0X0X
1=000X	6=0XX0
2=00X0	7=0XXX
3=00XX	8=X000
4=0X00	9=X00X

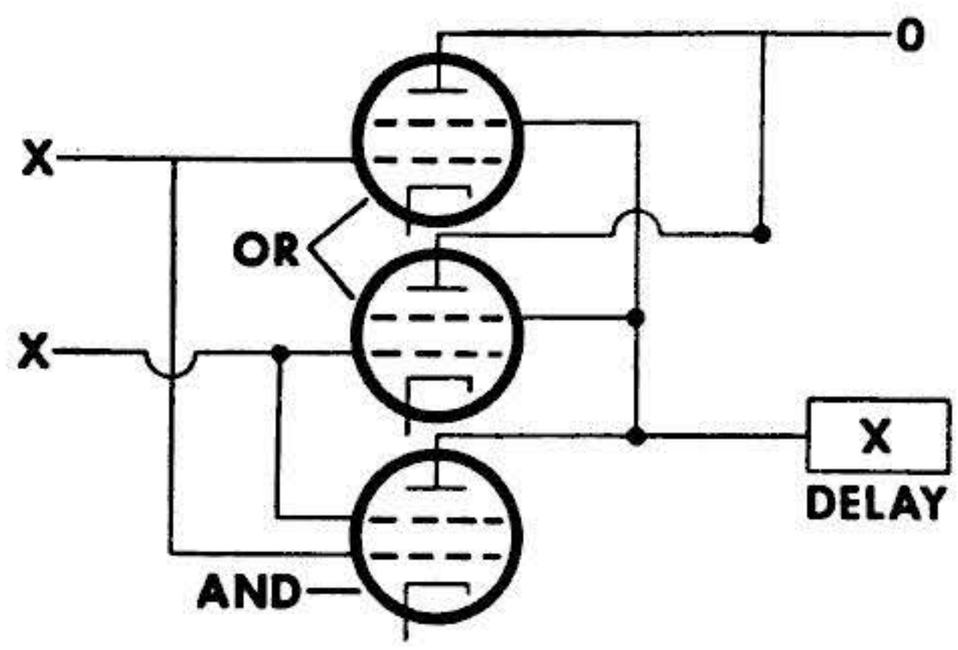
This code is added by ordinary rules: 0 + 0 = 0; X + 0 = X; X + X = 0 and carry X (like 5 + 5 = 0 and carry 1). Try adding 3 and 6 (below). First digit pair (at right) gives X. Second digit pair gives 0 and carry X. Third digit pair, plus carry from second, gives 0 and carry X. Fourth digit pair plus carry gives X.

3	00XX
+ 6	0XX0
9	X00X

Univac adds much this way with circuits similar to the one below. "Gate" tubes—which transmit a pulse only when both their grids are positive—are arranged in an "and" circuit and an "or" circuit that are used together. The "or" circuit has two tubes, each having one grid kept positive; the other grid must be made positive by an incoming pulse. Each tube receives one digit of a pair being added. The "or" circuit thus transmits only a blank if two blanks are received. If one blank and one pulse are received, it transmits a pulse, since one tube has its negative grid made positive. If two pulses are received, however, it must transmit a blank and carry a pulse to the next addition. This it does with the "and" circuit.

The "and" circuit has one "gate" tube, with both grids normally negative. Thus it sends a pulse only when it receives two pulses, one for each grid. It receives the same pairs of signals that the "or" circuit gets, but operates only when both signals are pulses. When this happens, the "and" pulse affects the "or" tubes, making one grid in each "or" tube negative, and the "or" circuit transmits a blank. The "or" answer becomes the total for that column, while the "and" answer is fed to a delay circuit. This "and" carry pulse is delayed until it can be added to the sum resulting from the following pair of digits. The second addition is done by another set of "gate" tubes much like the first.

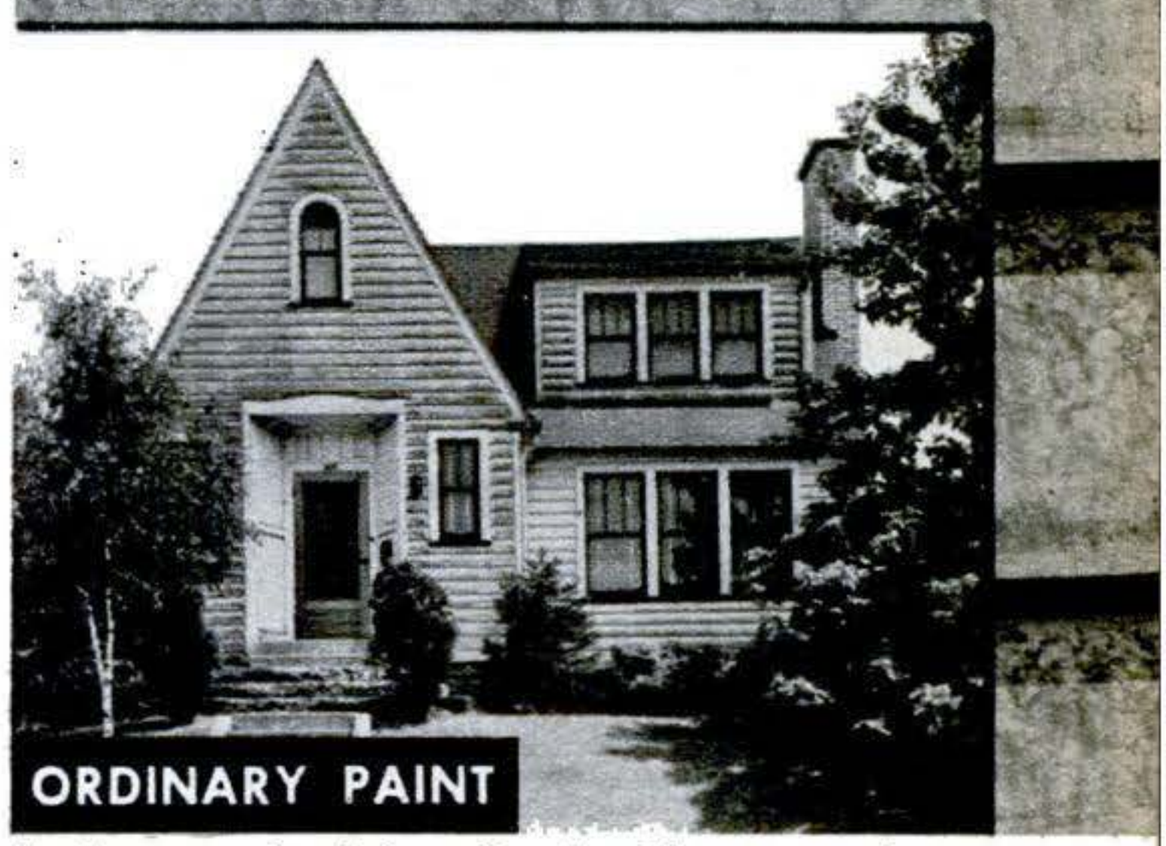




or instructions—expressed in pulse signals—will be recorded on the tape by the keyboard or by the machine itself. When Univac must get a number back from the tape, motors will move the tape backward or forward until the pickup is at the desired spot. Special tapes can be made up containing tables of frequently used information—such as logarithms, trigonometric functions—and kept on file.

These components of Univac make an "information-processing system" that works strikingly like the human nervous system. In fact, psychiatrists and psychologists often find it valuable to study the nervous system as an electric computing machine. END

Copyrighted material



These two houses in Morgantown, W. Va., were painted at the same time, the one on the right with ordinary lead-containing paint, the other with the new lead-free finish. Close-ups above houses show how, after 14 months, lead paint blackened while new lead-free one didn't.

New Paints That A Novice Can Use

Modern chemistry is working to give you new finishes that look better, last longer, and are easier to use.

By George H. Waltz, Jr.
PS photos by W. W. Morris

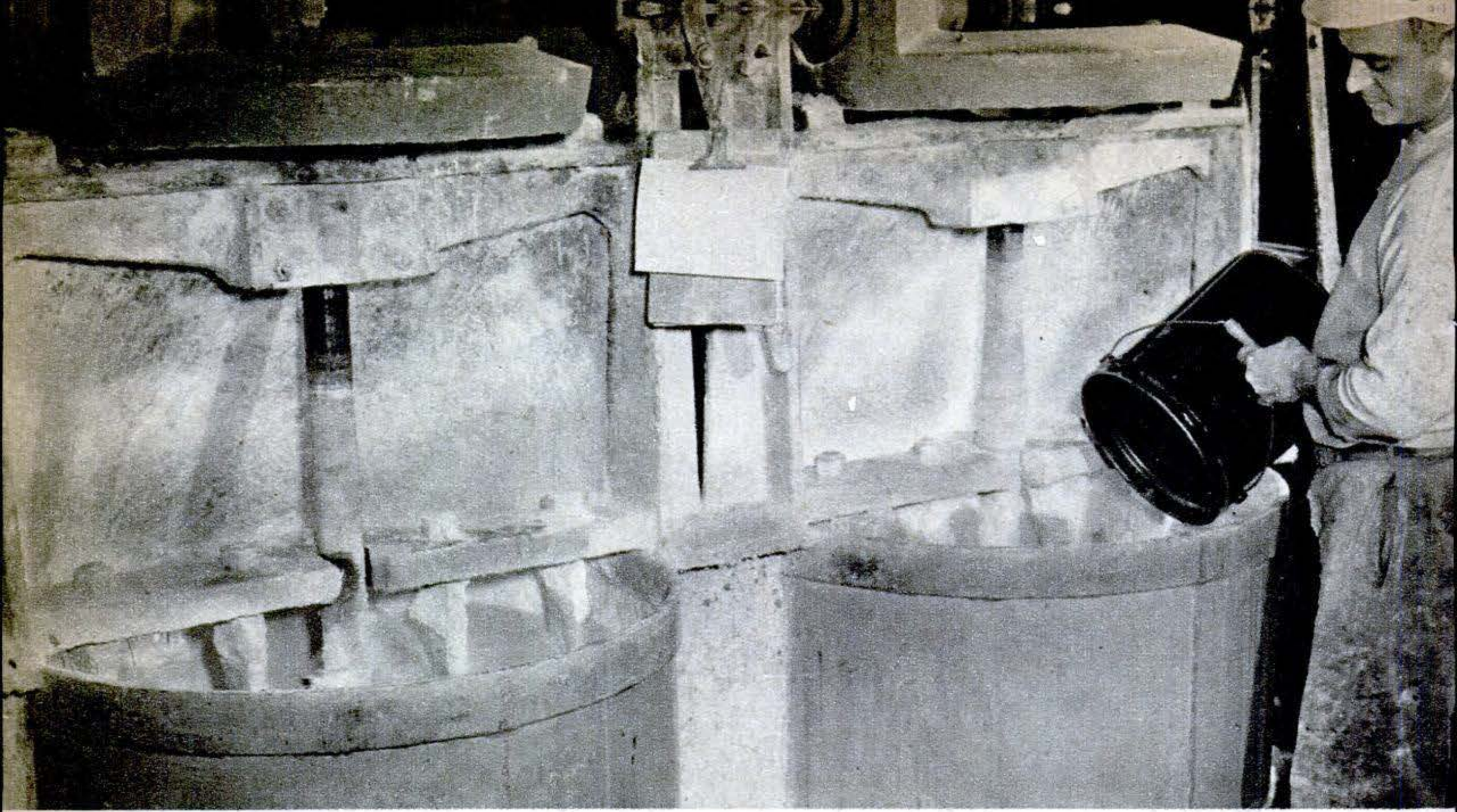
IS YOUR house beginning to look shabby? Cost too much to have it redecorated, you say? Maybe you're right, but have you considered using any of those new finishes on the paint dealers' shelves?

Since the war, paint manufacturers have been vying to produce "wonder paints." Now, revolutionary new products are available to lighten your painting chores.

They began to appear in 1942 when government officials asked the manufacturers for water-thinned paints that would be durable. An array of resin-emulsion paints resulted. Many paint buyers looked upon them at first as a wartime substitute to conserve critical paint-oil supplies. Bad experiences with earlier so-called water paints were recalled. But last year householders bought 100,000,000 quarts of such resin-emulsion paints as Sherwin-Williams' Kem-Tone®, Glidden's Spred-Luster® and Spred-Flat®, and Du Pont's Speed Easy®. Their price, easy application, and cleanability, plus the fact that they can be thinned with tap water, have made the resin-emulsion paints increasingly popular.

Until this year, water-thinned paints were available only in the lighter, pastel shades. Now come deep shades of blue, red, yellow, green, sienna, burgundy, umber, and brown. Like the original light-hued wall finishes, the new, deeper, resin-emulsion shades go on easily with brush or roller and, in most cases,

Copyrighted material



Paint is made in three steps: initial mixing, grinding, and final mixing. In first mixing of Kem Glo®, at Sherwin-Williams' Newark, N. J., plant, where these pictures were taken, pigment and just enough synthetic resins to form thin paste are churned in big paddle mixers above. After grinding (right), color, other ingredients, and rest of resins are added for final mixing.

cover wall surfaces with a single coat. There is no change in mixing either—to every quart of paint you simply add a pint of water.

In a sense, the modern, water-thinned, resin-emulsion paints mark the completion of a cycle in paint-making techniques. Basically, a paint is nothing more than pigment mixed with a liquid that will allow it to be spread over a surface. The paints of the ancients were just that—pigment mixed with water. Later, man discovered that adding egg yolk would make them stick better. Still later, paint men found that oil formed a better vehicle, combining with the pigment to dry to a hard film. To speed up the drying, they added driers, and to make the oil more spreadable they added thinners in the form of turpentine or mineral spirits. And ways were found to add a wide range of coloring materials to the basic pigments. Today, synthetic resins have replaced some or all of the oil in many paints. In the new water paints the oil and resins are thinned with water.

Now, many more new paints are rapidly becoming available. Some already have been announced. Others are still in the laboratories of paint companies, and some are mere gleams in the eyes of chemists.

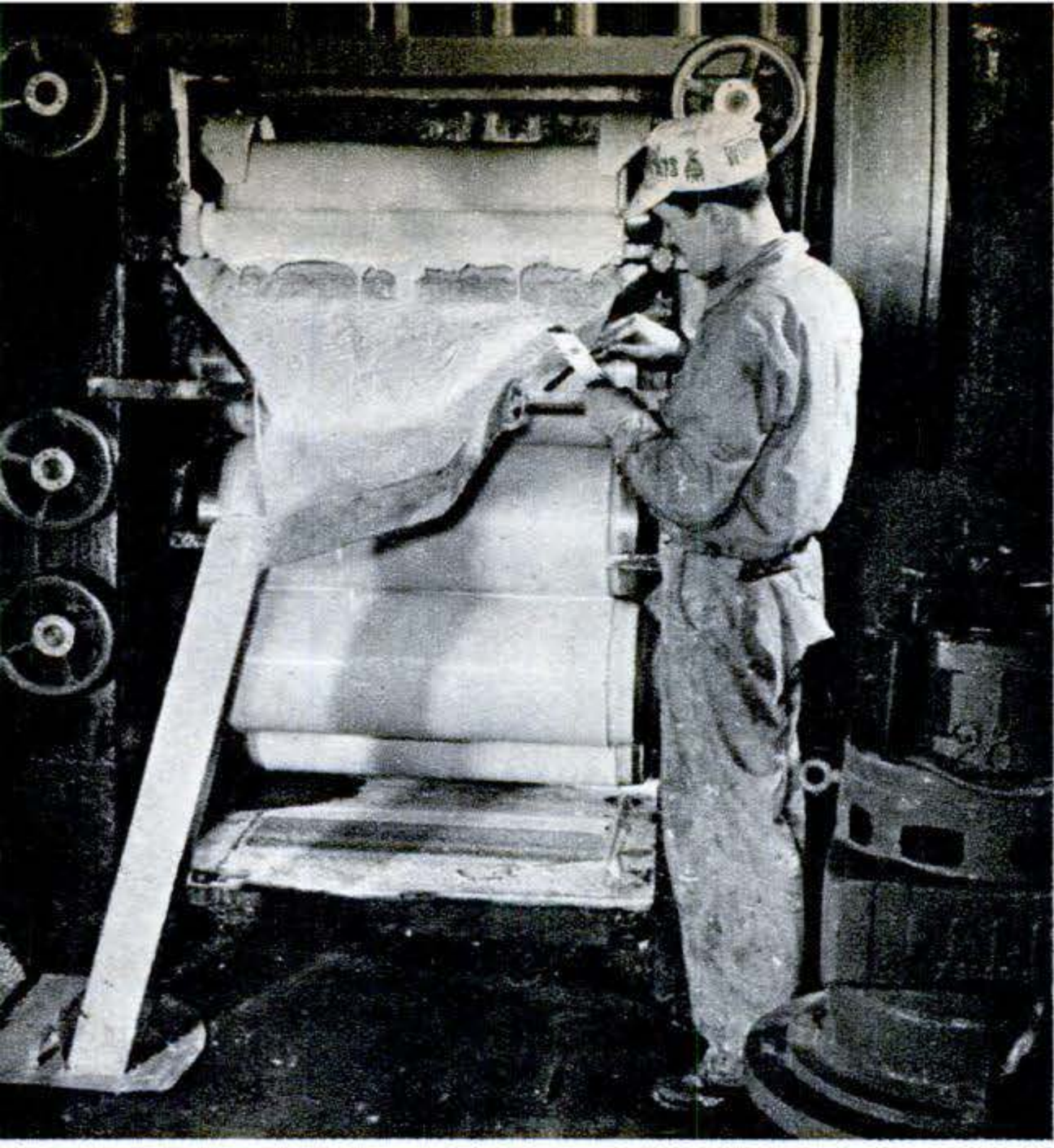
One that is just now reaching dealers' shelves is a gloss finish with a "baked-on-enamel" look that can be brushed or sprayed on as easily as any ordinary paint. Designed for use on walls, woodwork, metal, and furniture, the new paint—called Kem Glo® by its makers, the Sherwin-Williams Co.—dries without brush marks in from three to four hours to produce a hard, plasticlike, easily cleaned surface that looks like the finish on your refrigerator or kitchen stove. It can be used indoors or out and gives good, one-coat coverage over most surfaces without a primer or undercoat. Where two coats are needed, the new paint itself is applied for each coat just as it comes from the can.

New Paint Outwears Old

One of the paint engineers who helped concoct the formula for it coated a square section of the floor in front of the door to his much-used office with it to test it. Months of foot traffic failed to chip it or wear it off. The building maintenance crew then gave the whole floor its periodic coat of regular floor paint. Since then, continued scuffing has worn the ordinary paint thin to reveal the bare floor—and the enamel test panel, which is still holding up.

The new enamel finish gets its long-wearing qualities and "baked-on" look from a combination of titanium oxide, titanium calcium, synthetic resins, hydrocarbons (oils), and pure color. Just how these ingredients

Copyrighted material



After first mixing, paste of pigment and resin goes to big grinding machines, where five large rollers pulverize pigment into fine particles to give paint smooth texture and even consistency.

More paddle mixers, below grinders, give paint final, thorough mixing. Automatic filling machine above then pours just right amount of paint into each can as row passes by on conveyer.

are mixed is the paint manufacturer's secret.

The use of titanium compounds, however, is significant. Titanium pigments also form the basis of another new finish—a lead-free house paint recently announced by the Pittsburgh Plate Glass Co. This new outdoor paint, called Sun-Proof®, is said to resist darkening or graying even when applied to houses in or near large industrial areas where the air contains sulphurous fumes and other corrosive gases. Ordinary lead-containing paint blackens under such conditions because the hydrogen-sulphide gas in the air combines with the lead in the paint to form lead sulphide, which is black.

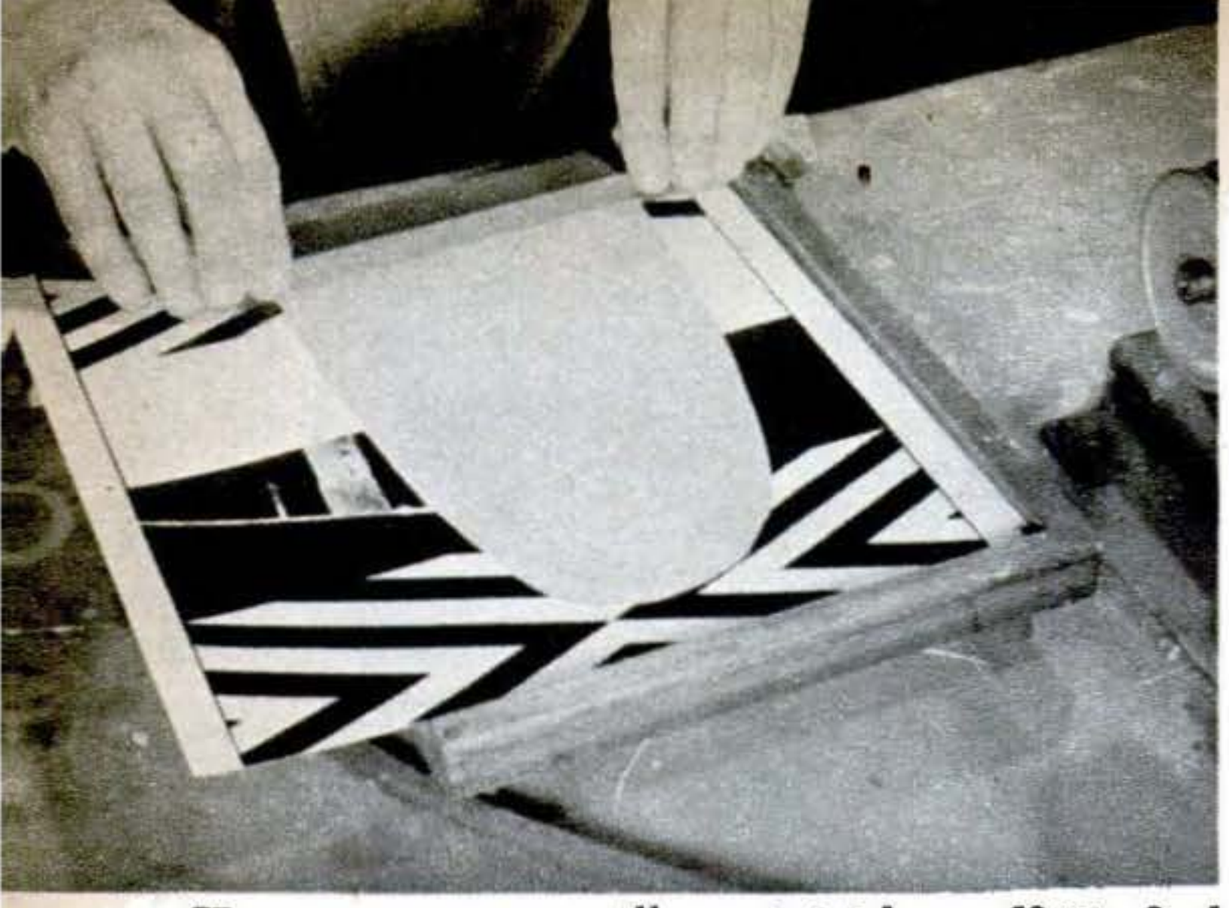
A special chalking (flaking off) process built into the new lead-free finish makes it literally self-cleaning. As the paint chalks off, rain washes away the old finish surface with the dirt.

Titanium is not new to the paint industry. Titanium oxide and other titanium compounds have been the paint chemist's idea of the whitest pigments for almost fifty years. Until recently, however, titanium compounds were expensive and hard to get. The ore, ilmenite, from which titanium oxide is obtained, is plentiful, but separating the oxide from it was not easy—until the chemists discovered the trick.

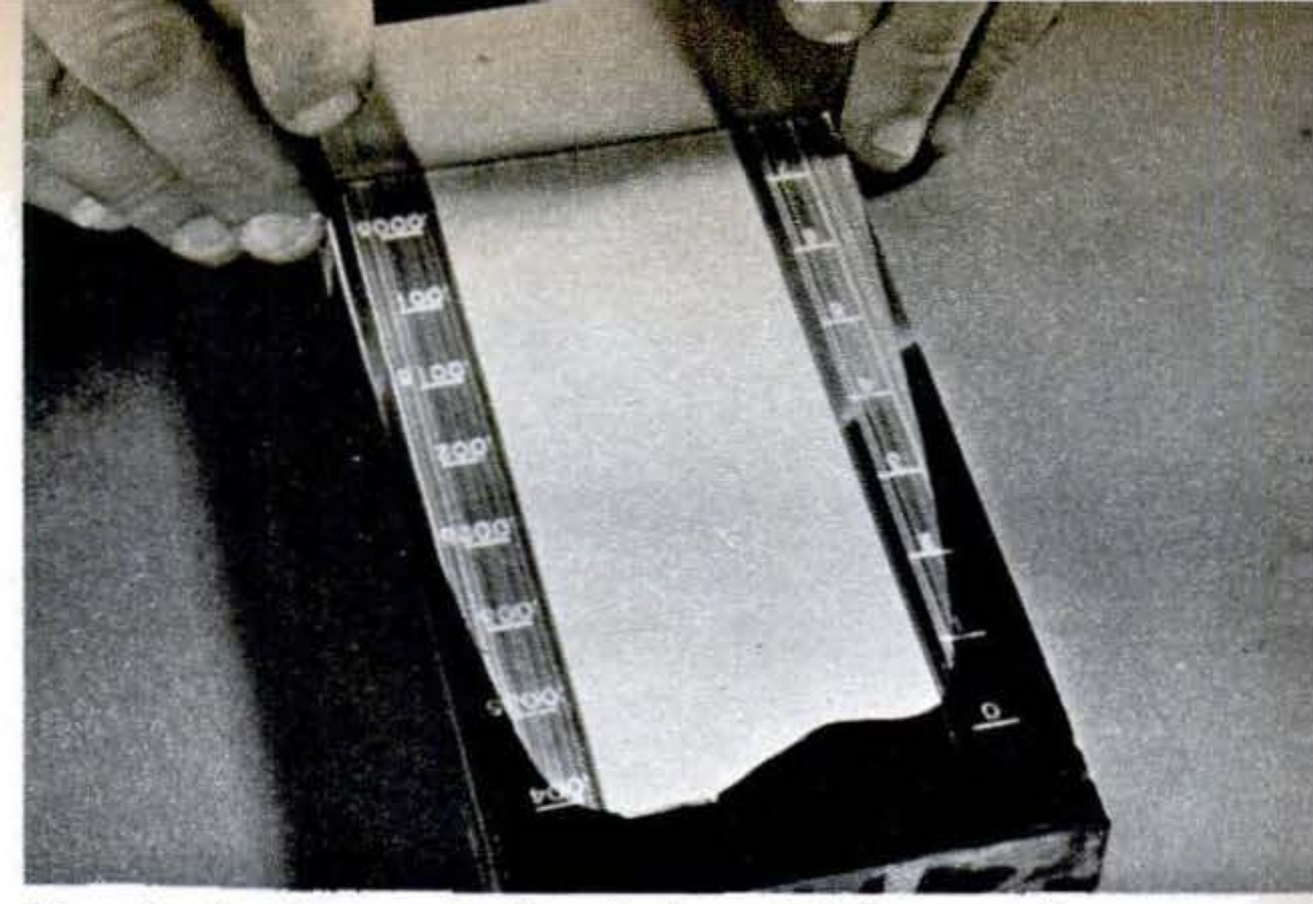
Just as pure titanium, because of its strength and light weight, has many uses as a metal (P.S., Dec. '48, p. 105), the compounds of titanium are valuable in paints for more than their whiteness and inertness. Their light weight also makes it possible to produce lightweight paints. In painting large bridges and boats, weight is important. By using titanium paints instead of lead paints,

The paint is not all that's new. This new spring-tension can top needs no pulling, pounding, or prying. It slides on and off easily, makes an airtight seal, and will not clog with paint.

Copyrighted material



How many coats will a paint job need? To find out, manufacturer spreads a paint over this black and white test pattern. Amount of pattern showing through measures paint's covering qualities.



To check fineness of grind, paint is spread along graduated strip until it thins to point where pigment particles can be seen. Length of this streak, read from scale, is then index of grind.

as much as 75 tons can be saved on a large liner or battleship.

A third new titanium-containing paint, recently announced by the Glidden Co., is a one-coat, outside house paint. It's said to cover so well that a single coat will do the trick on most repainting jobs where the surface is not too bad. On new construction, a single coat applied over a primer gives an appearance equal to two coats of ordinary paint. Tests have shown it to be extremely durable. A Texas gas station that was used as one of the first test jobs six years ago is still listed by the oil company's inspectors as "in excellent condition."

One Coat Saves Cost

Although this new paint, called Endurance Imperial®, costs about $2 more a gallon than the lead paints, its over-all cost, based on the one-coat claim, is little more than half that of ordinary paints. At the moment, the new finish is available only in white.

Another 1949 Glidden innovation is a primer and sealer called Spred Vapor Barrier®. It's said to seal perfectly with a single coat. It dries quickly, is virtually odorless, and can be used in place of the usual vapor-barrier paper required in new construction. It's even said to be twice as efficient as the minimum FHA vapor-barrier requirements.

If you want a real plastic coating that can be brushed or sprayed on like a paint, the Corrosite Corp. has it for you. Consisting of a combination of thermoplastic and thermosetting plastics, the new coating can be applied to wood, metal, masonry, and even cinder blocks. It is odorless and nonflammable when dry and extremely resistant to all kinds of corrosion. In a recent test, two metal panels—one coated with an ordinary high-quality enamel, the other with Corrosite®, as the new plastic paint is called—were immersed in a vat of sulphuric acid. The ordinary enamel dissolved immediately. The plastic paint covering was unaffected after 20 minutes in the corrosive bath!

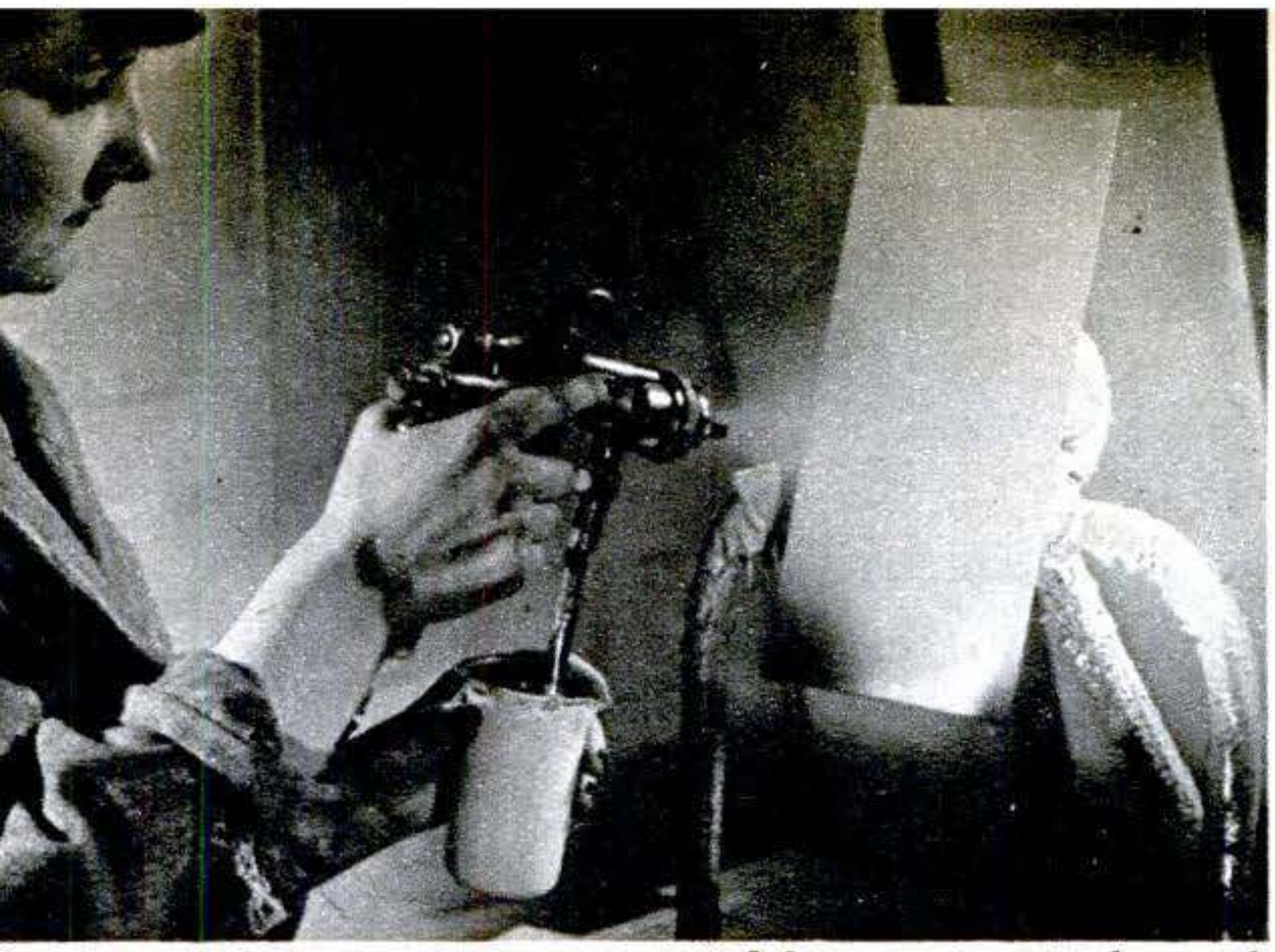
Although developed primarily for industrial use, where a hard, long-wearing, chemical-resistant finish is needed, the plastic paint has numerous household applications. Providing a rugged, watertight surface, it is a candidate for concrete cellar floors, exposed porches, steps, and even roofs. Photographers can use it as a protective coating for darkroom surfaces. A gallon, averaging $6.95, will cover about 500 sq. ft.

You can even mix up your own stainless-steel paint. A new stainless-steel powder, stirred into any fast-drying clear lacquer or spar varnish, can be brushed or sprayed on just about any surface to provide a decorative as well as corrosion-proof finish.

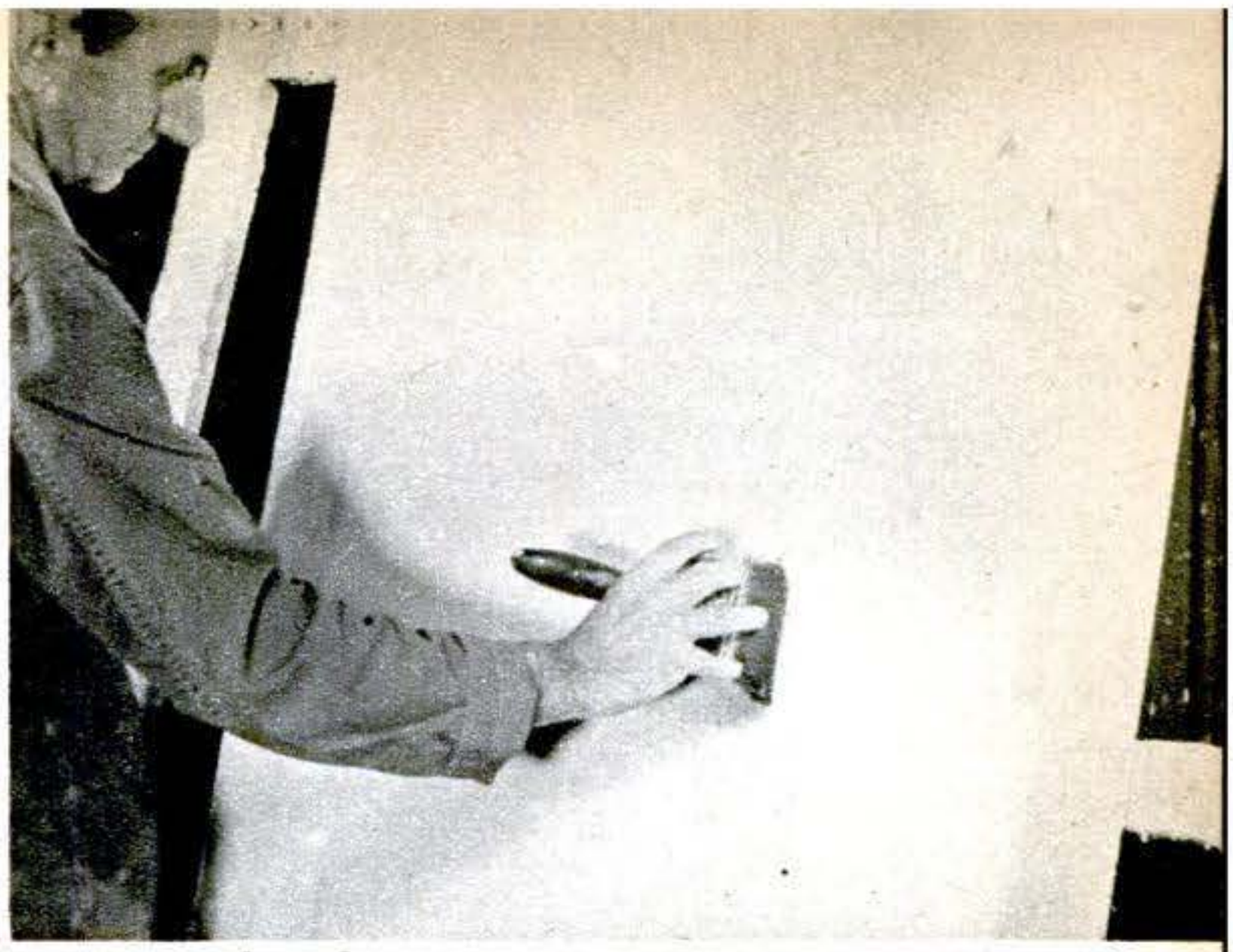
At Sherwin-Williams, Du Pont, Glidden, Devoe & Reynolds, Pittsburgh Plate Glass, New Jersey Zinc, and many other companies, the paint experts are striving for newer, longer-lasting, foolproof finishes that will protect as well as beautify. And one of their main objectives is to make it easier to turn out a good paint job. Their goal is to build the professional, smooth, mark-free look right into the paint itself, instead of leaving it to the skill of the brush wielder.

But probably the biggest news is a prophecy. According to most experts, all household paints will be of the easy-to-apply, water-thinned variety within fifteen years! The kitchen faucet will then replace the thinner and the paint-brush cleaner. END

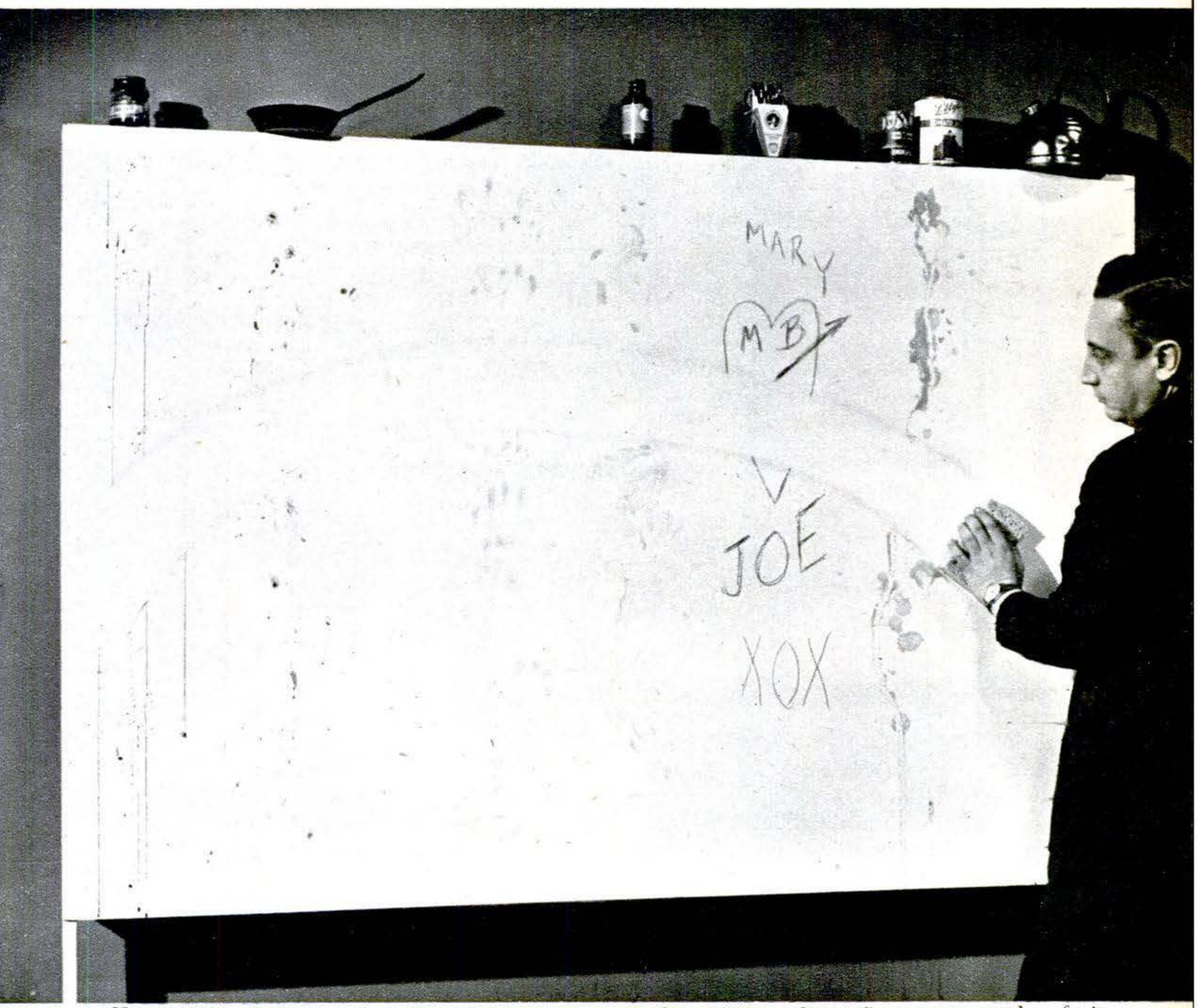
Copyrighted material



Spray paints are tested by coating trial panel with spray gun. Next, paint will be heat-tested. During a production run, paint samples are tested every few hours to insure uniformity.



To pass brushing test, paint must go on smoothly and show minimum of those maddening brush streaks and lap marks. Nonabsorbent paper used shows up flaws other surfaces might hide.



Cleanability of the new Kem Glo paint is shown in this rough test. A painted panel, smeared (left to right) with ink, cooking grease, finger marks, Mercurochrome®, crayon marks, fruit juices, is easily cleaned with a standard wall cleaner. Even boiling water will not mar finish.

Copyrighted material

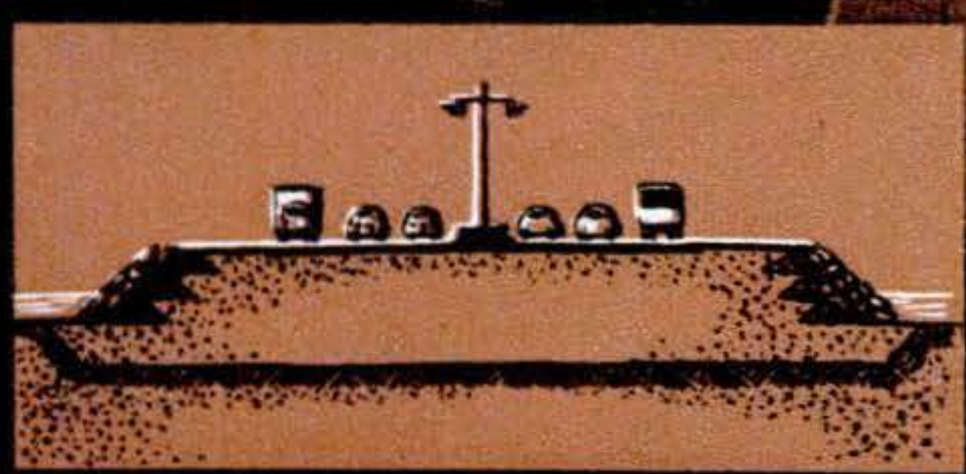
Additional proposal to tunnel-trestle crossing is sister span to parallel existing San Francisco-Oakland Bay structure.

Artificial sand islands, flanking channel, would carry tunnel entrances, ventilation plants. Lighted piles would warn ships.

Drawing above shows how concrete slabs would first be layed on pilings sunk in sand-filled trench, to check settlement in bottom mud. Tubes would then be lowered by crane onto slabs. Cross section below shows tubes covered with sand and rocks to hold them in place. The spaces at top and bottom of tubes would be provided for ventilation.

Copyrighted material

This Bridge Goes Under Water



Sand-fill causeway would extend more than mile into bay. Rest of overwater structure would be trestle on concrete columns.

A PREFABRICATED tunnel, built in sections to be dropped to the bottom, may help speed traffic across San Francisco Bay. It is proposed to carry a six-lane highway under the 50-foot navigation channel. Together with several miles of trestle and a mile-long causeway, the structure would stretch 6½ miles between San Francisco and Alameda.

The unique, 6,000-foot-long tunnel would consist of three tubes of reinforced concrete, each 37 feet in diameter and carrying two lanes of traffic. The tube sections would be built in drydock near shore in 200-foot lengths and sealed at the ends with temporary bulkheads. They would then be towed floating to position, weighted with water, and lowered to the bottom by cranes. With the addition of each section, the bulkheads in the preceding one would be removed, permitting interior work to begin immediately. Special connectors would force the sections snugly together and rubber seals make the joints watertight. Walls of the tubes would be 2½ feet thick.

If approved by Congress, the project will take about five years—and $172,000,000.

Copyrighted material

Building a Shirt Around a Man

PS photos by W. W. Morris

ENGINEERING shirts to fit different sizes and shapes of men takes as precise blueprinting and assembly as building an automobile.

The related variables are neck, sleeve, chest, and waist. For each neck size from 13½ to 16, for instance, there is a 2-in. difference in body width; for each size from 16½ to 18, a 2½-in. difference in body.

More than 60 skilled workers helped to make the shirt you are wearing. Among them were 42 seamstresses, who used 125 yards of thread and 17,250 stitches to join its 28 carefully cut pieces of cloth. So it's no wonder that POPULAR SCIENCE's reporter and photographer were surprised to see, on a visit to a shirt factory, that even white shirts stay sparkling clean through all this handling.

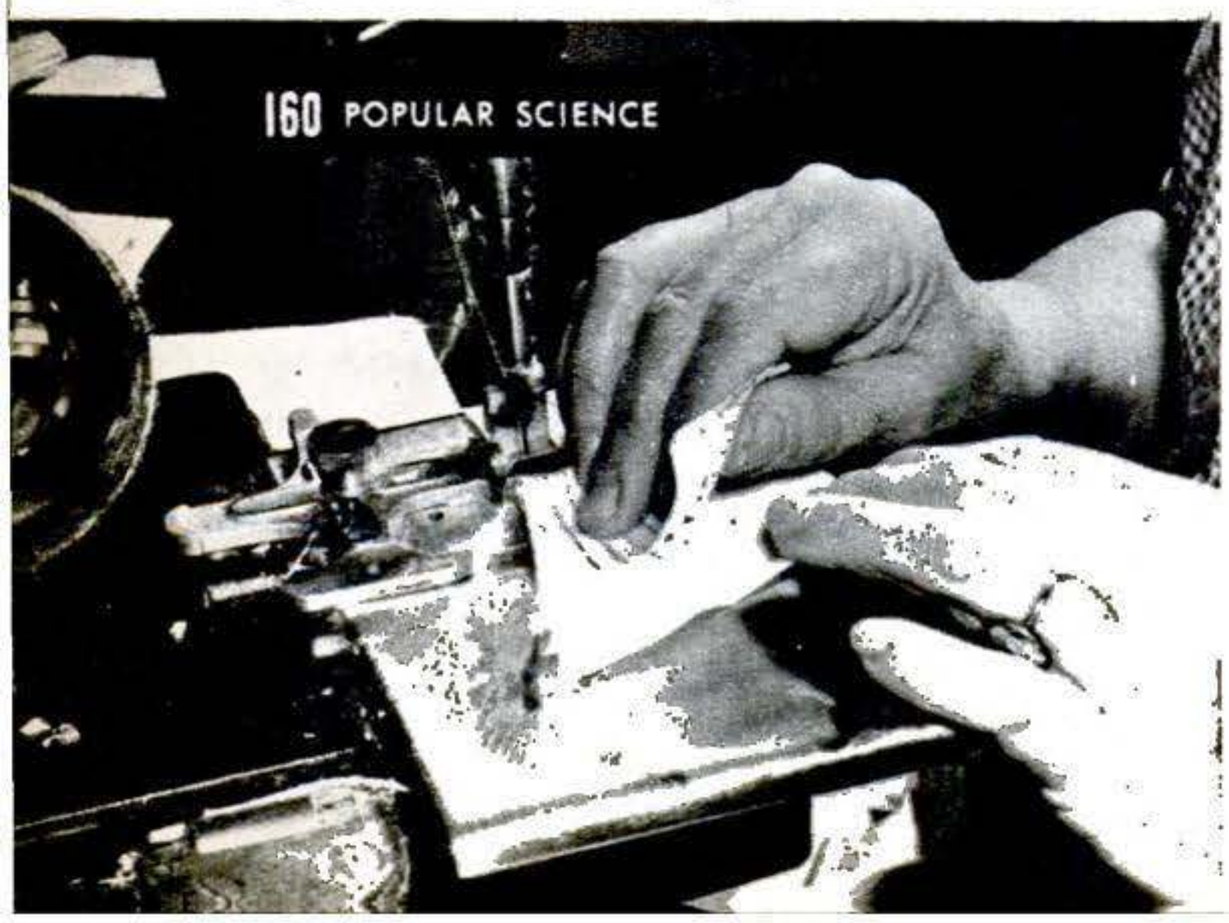
Photos of the shirt-manufacturing sequence shown on these pages were taken at the plant of the Manhattan Shirt Co. in Paterson, N. J.

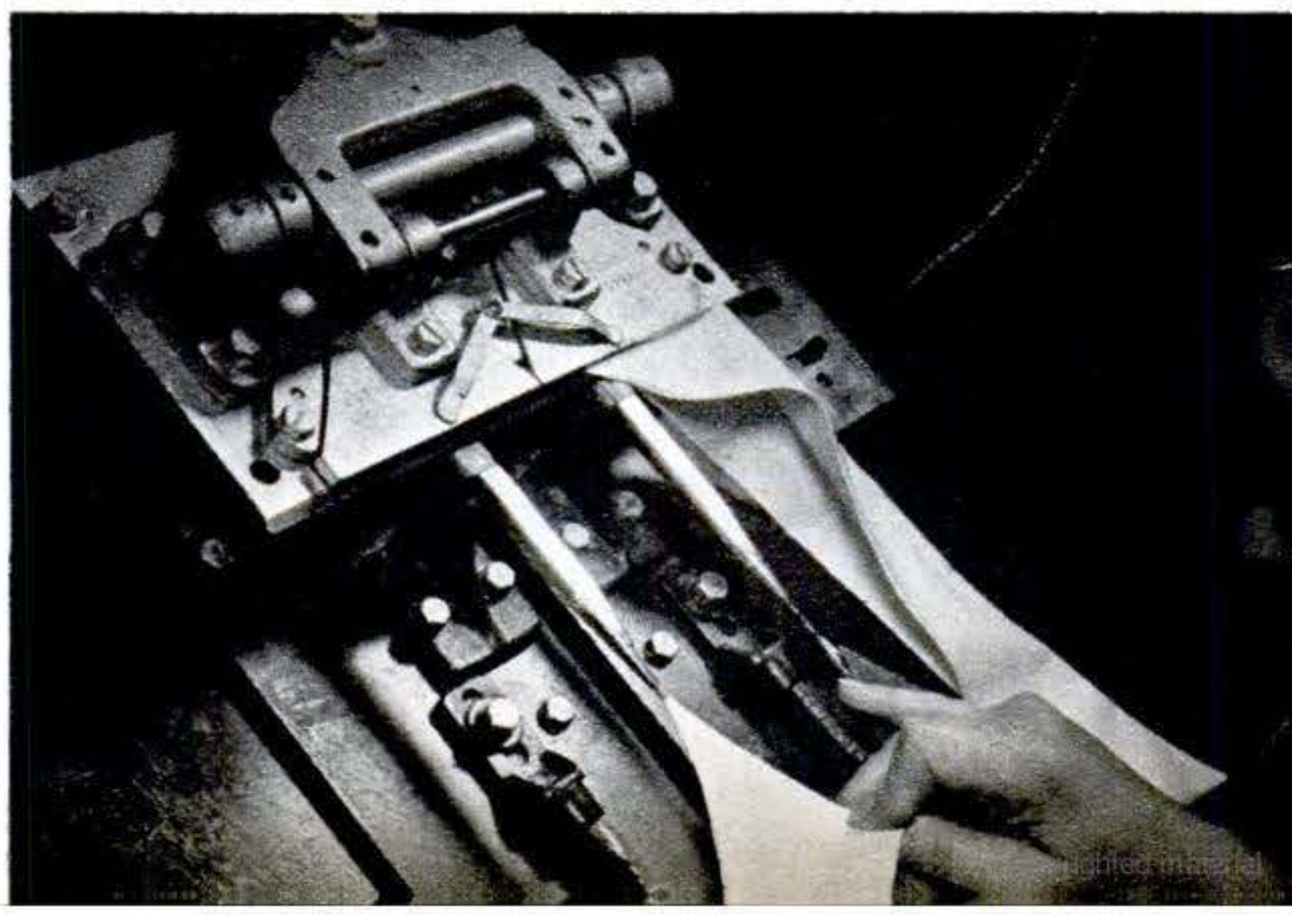
1. These wooden shirt-front patterns, size 13½ to 18, show the change in waist contour for each size. Smallest size, in foreground, is the most curved; largest size is straight across. The row of slots near the bottom of the pattern guide the cutter when aligning it on striped cloth.

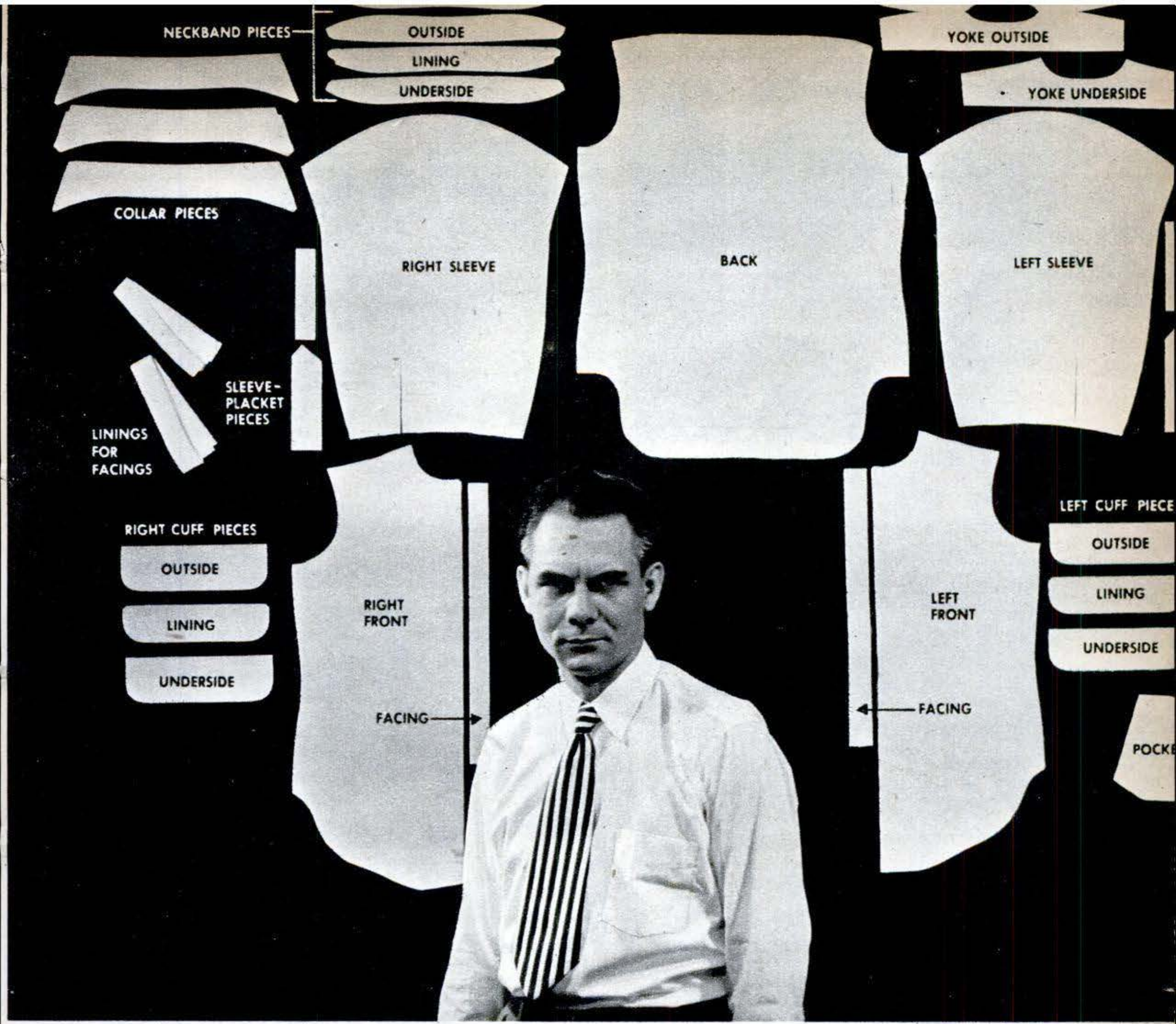
2. Using a sharp, short-bladed knife, cutter cuts collars out of 48 layers of cloth. Pins protruding from material in front of worker guide him when spreading striped shirting on cutting table. In the foreground are a wooden pattern, a stack of cut-out collars, and a knife.

3. Sewing-machine operator (below) collects collar outside, underside, and lining for joining around the edge on the wrong side. All the points must be carefully cut to avoid excess material that would cause bunchiness when collar, after being sewed, is turned right side out.

4. Collar point is placed wrong side out over dartlike tip of the turning bar on the machine below. Operator then draws point down over a die blade to pull collar right side out, hiding seam. Blade now moves collar up into die, as shown at right, for shaping and pressing.



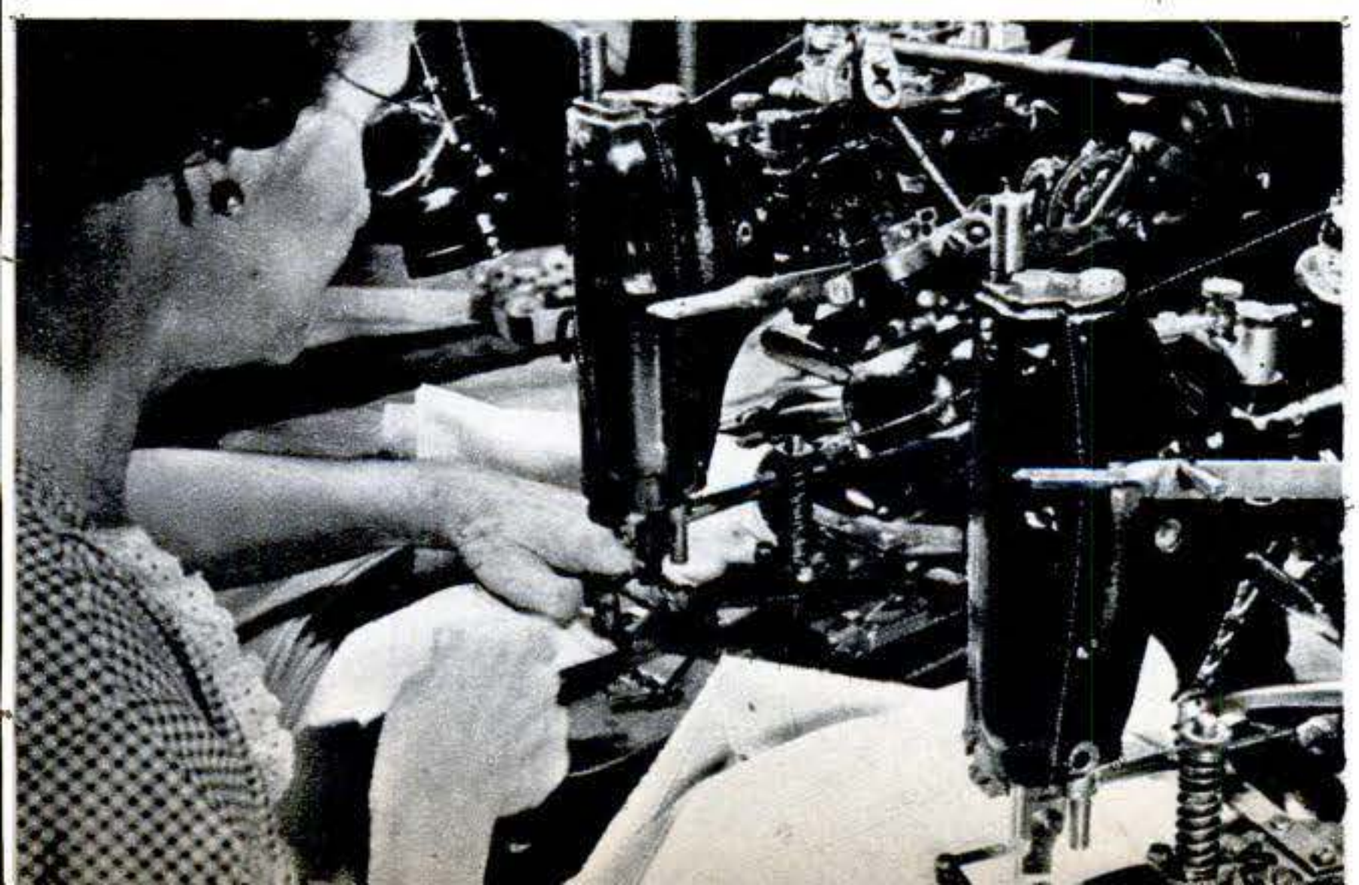


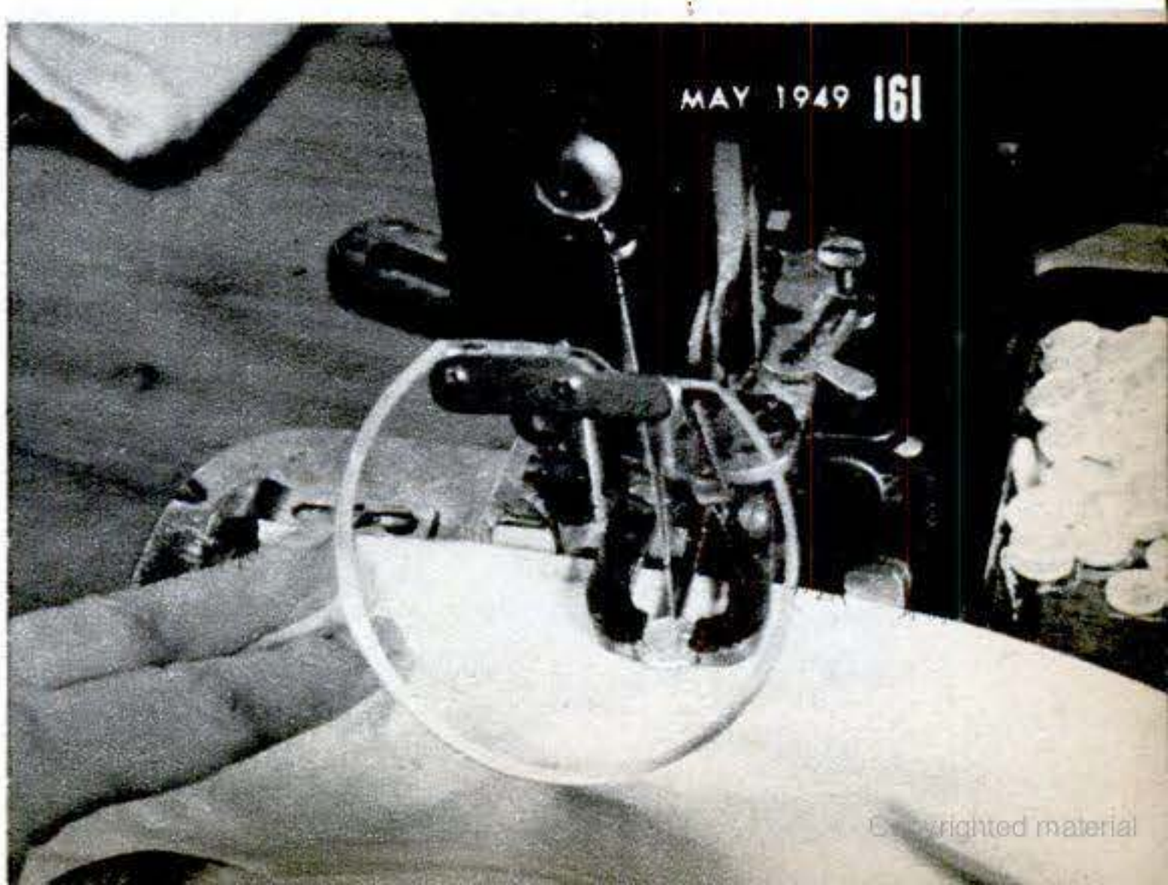


There are 2½ yards of cloth, cut into 28 pieces, in a shirt like the one worn by the model above. The yoke has two pieces; the cuffs, neckband, and collar have three pieces each. Some types of collar require additional pieces. The back of the shirt (top center) is slightly arched toward the top edge, where it is sewed to the yoke, in order to give wearer room for reaching and stretching. A shirt also gets necessary fullness from a generous width allowance, and from gathers or pleats sewed in near the shoulder blades. Those are points to watch for in buying a shirt.

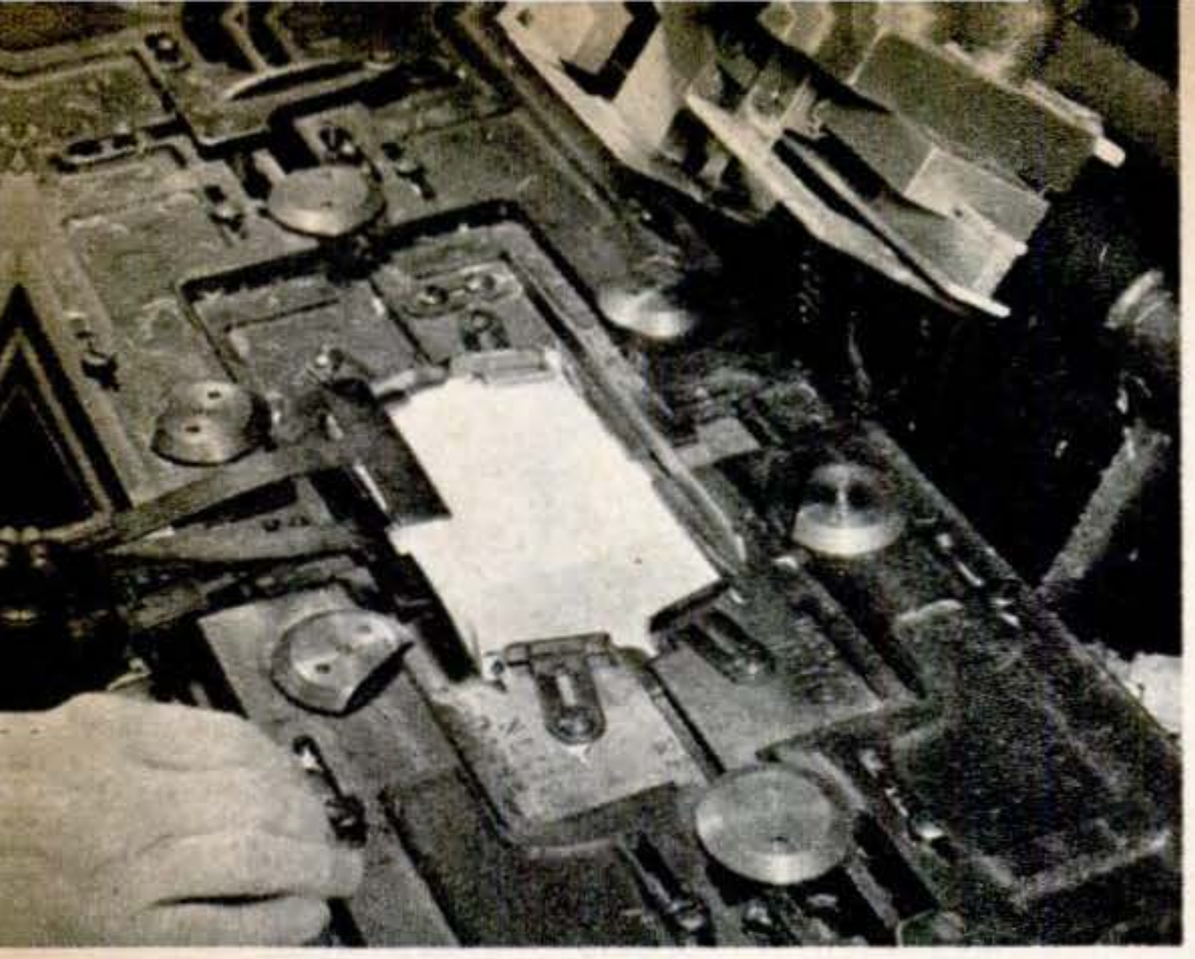
5. Worker positions cloth in buttonholing machine at center below, while machine at right sews a buttonhole in another piece of goods. **After a buttonhole is sewed, a knife located behind the needle descends with lightning speed to slit hole between the rows of stitching.**

6. Button, gripped by three-prong holder in machine below, is sewed on shirt with 18 stitches. **Correct distance to next button is determined by moving the sewed button to a metal stop near operator's hand. Circular glass guard on sewing machine shields worker if needle breaks.**

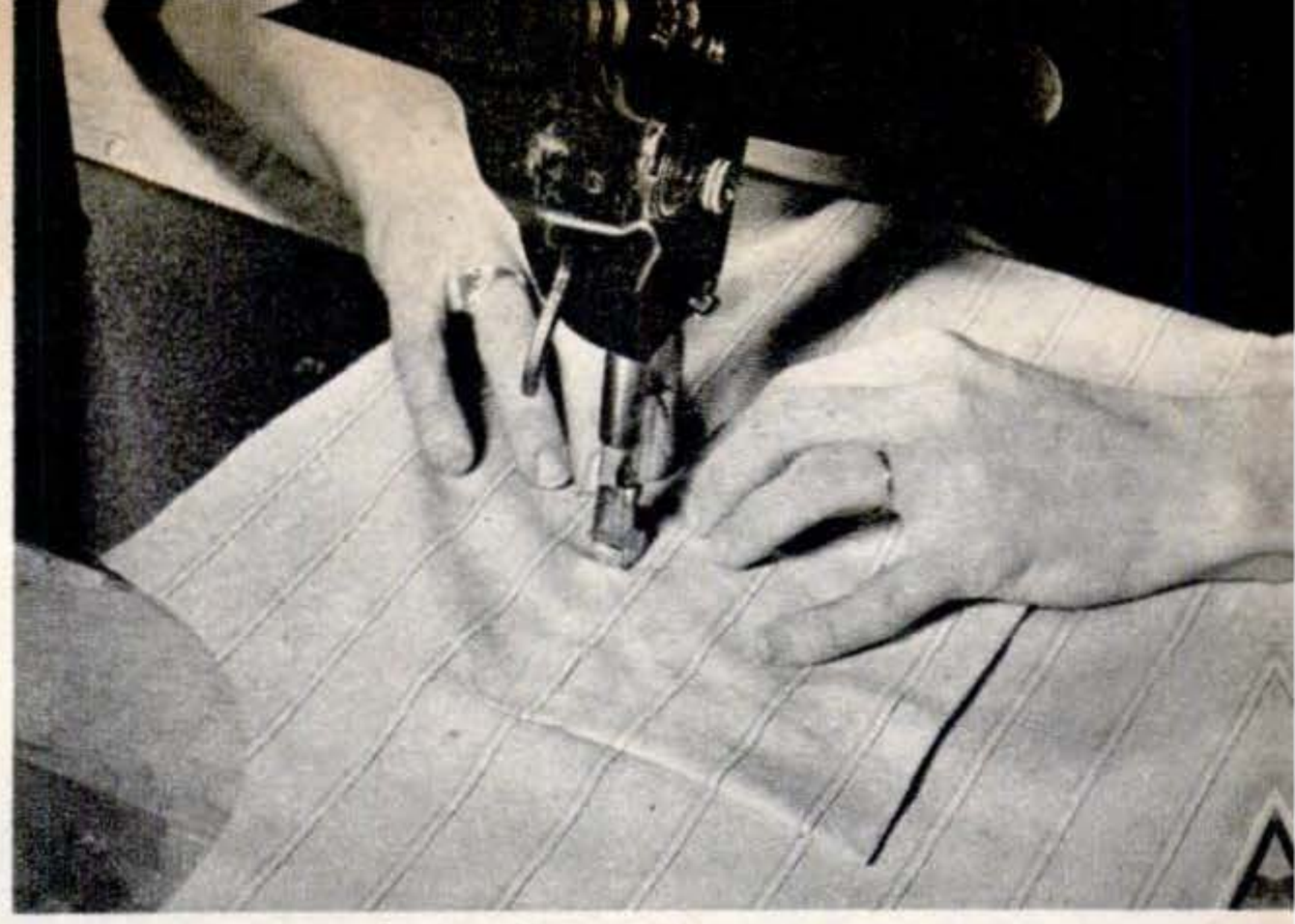




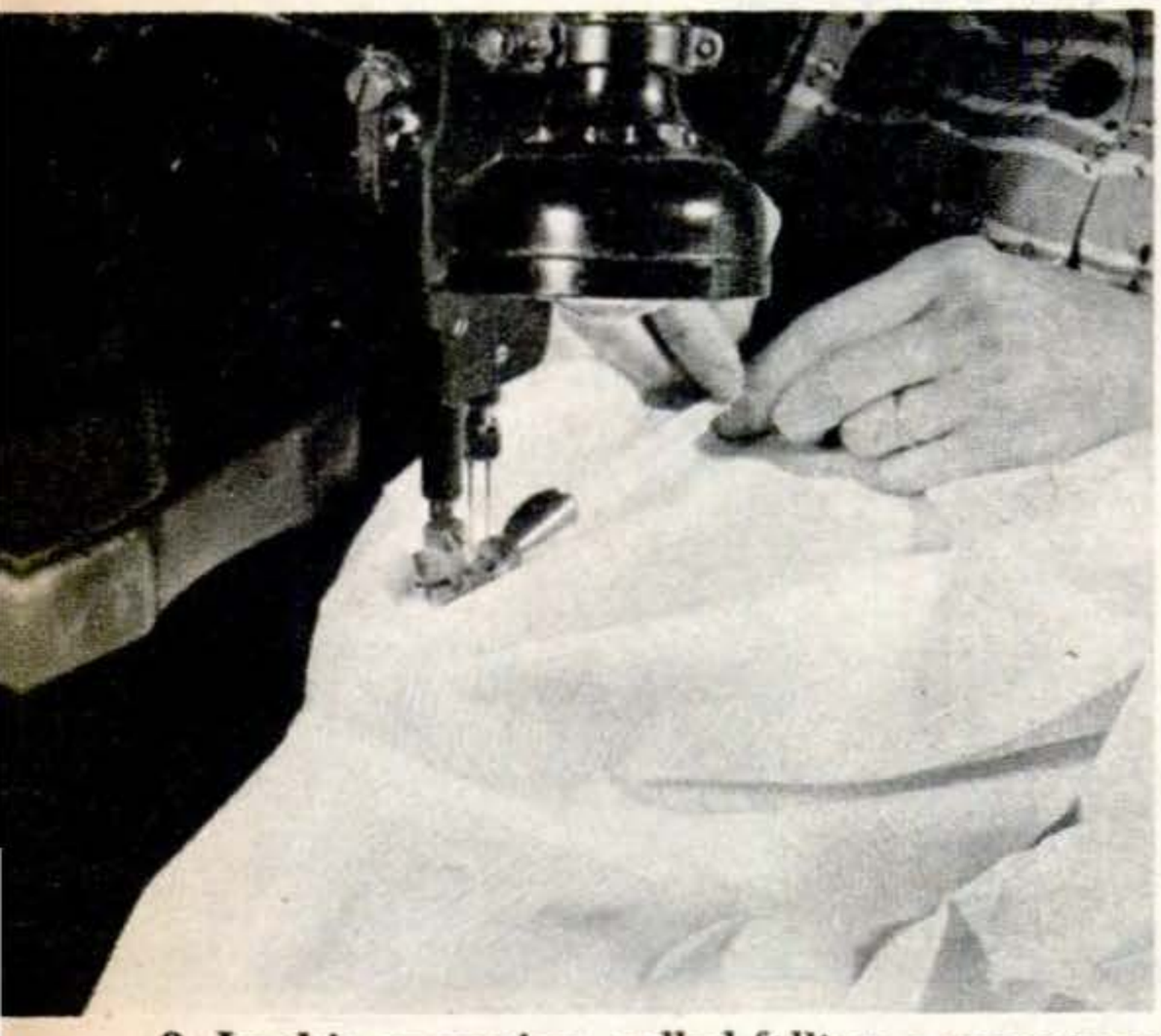
Copyrighted material



7. Machine above creases pocket, lying on steam plate, over a die (in raised position) to give it uniform shape. As die descends, slotted plates move toward pocket, turning up edge.



8. Pocket stitcher, one of the fastest seamstresses in Manhattan Shirt Co. plant, picks up pocket, matches its stripes with shirt-front stripes, and sews it on in a matter of seconds.

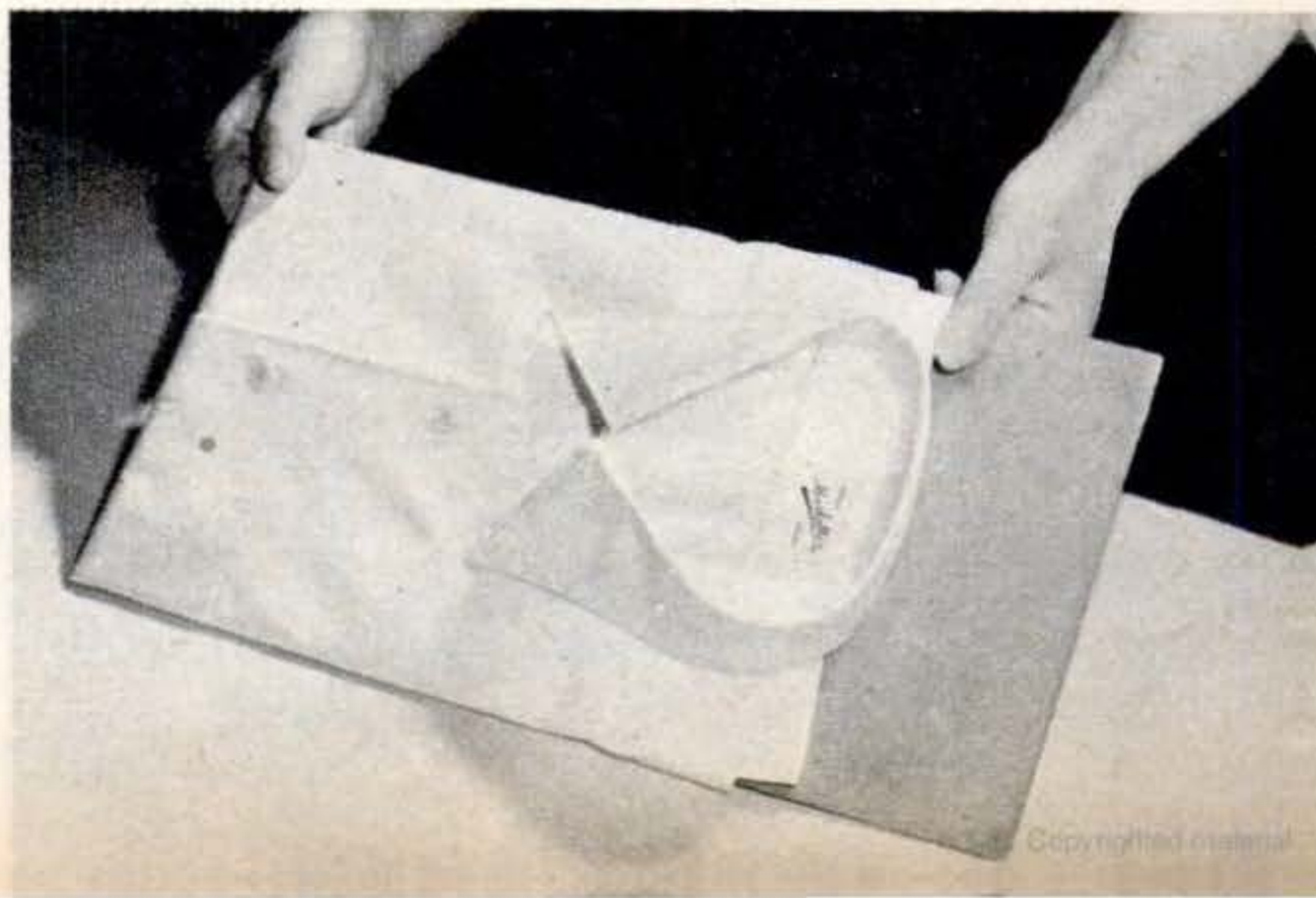


9. In this operation, called felling, a seamstress sews a double seam in the shirt from the end of sleeve down to the tail. A curled metal plate, in front of the two-needle foot, turns under the raw edge of the fabric. Note spotlight on work.

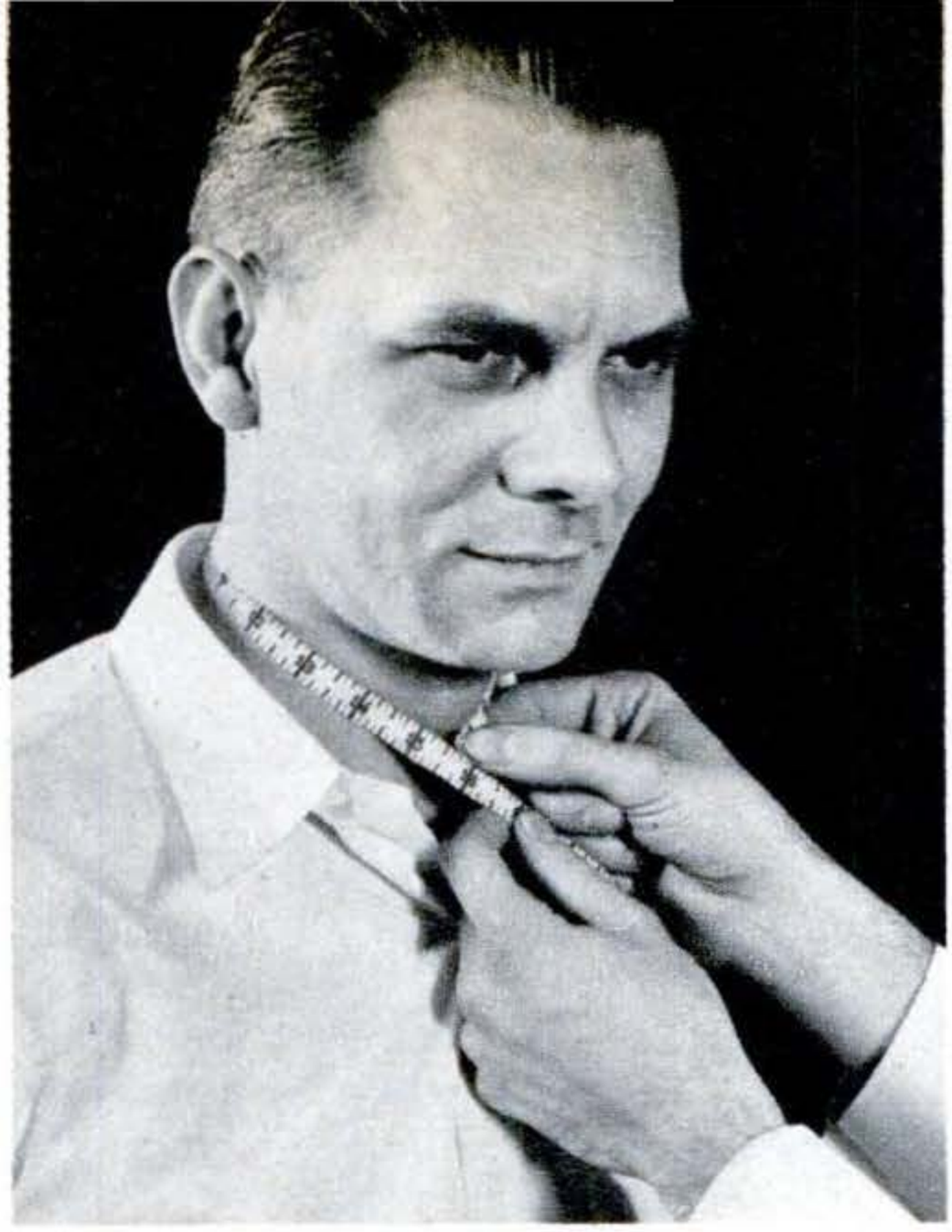
10. In the laundry, neckband is starched to size-fix it, and give wearer a comfortable feel on the neck. After starching, neckband is placed on curved press, as shown above. Machine head, here raised, comes down on neckband to dry it.

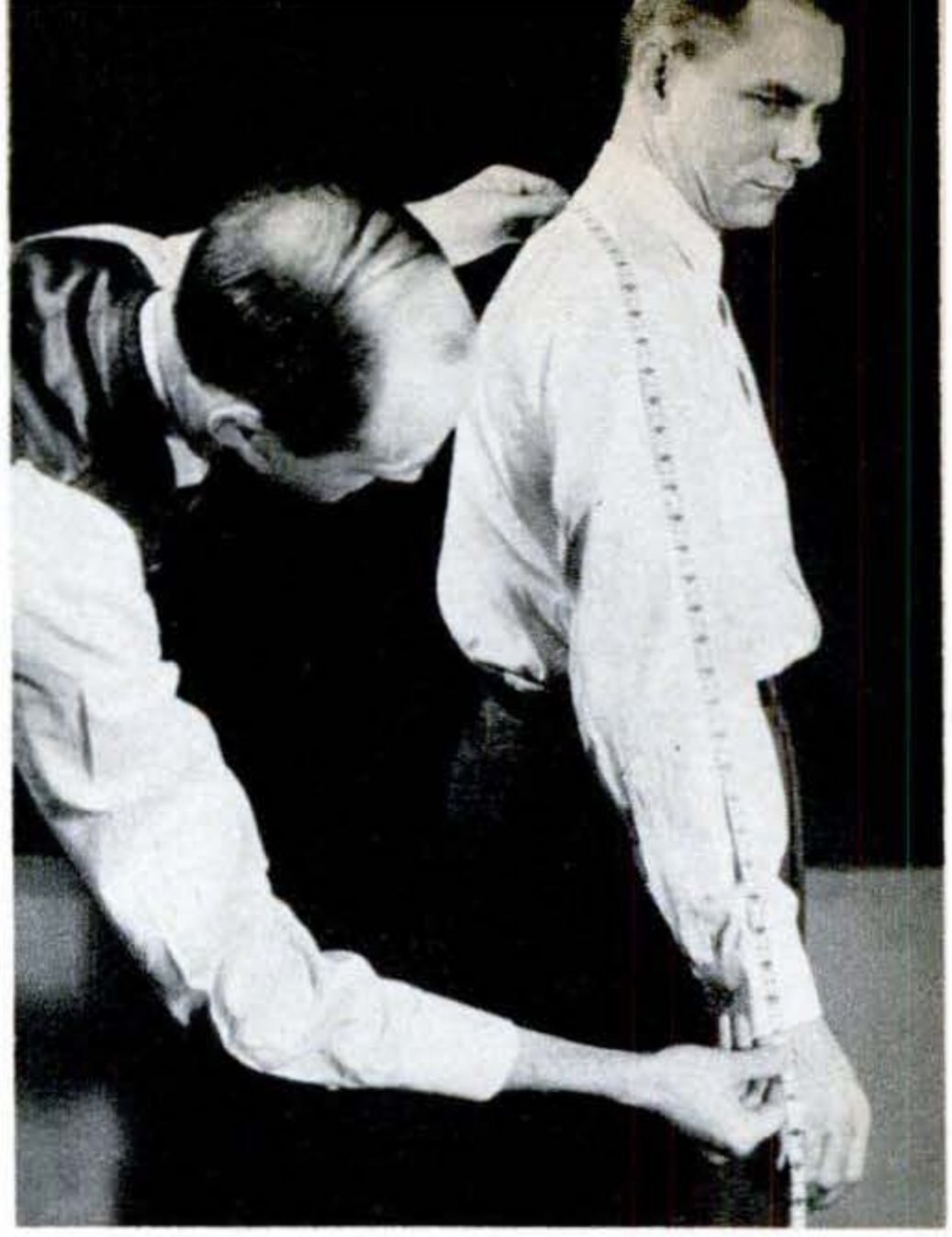
11. After size-fixing operation, collarband is measured (below) with flexible steel ruler from inside of button to outside of buttonhole. This measurement must come within 3/16 of an inch of the size stamped on the inside of the collar.

12. Before a shirt is ready for shipment from the factory, a cardboard form is inserted to aid the worker in folding and pinning the shirt tightly. The cardboard base is then removed, as shown above, and the shirt is packed.



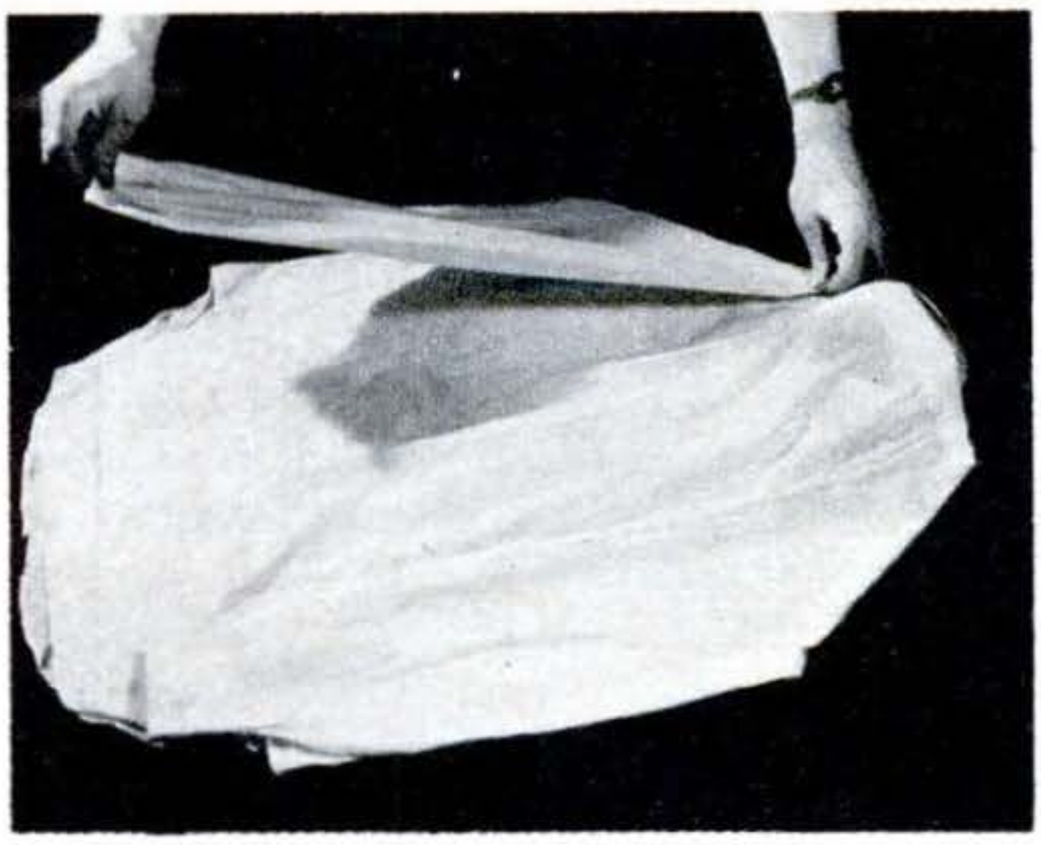
Copyrighted material

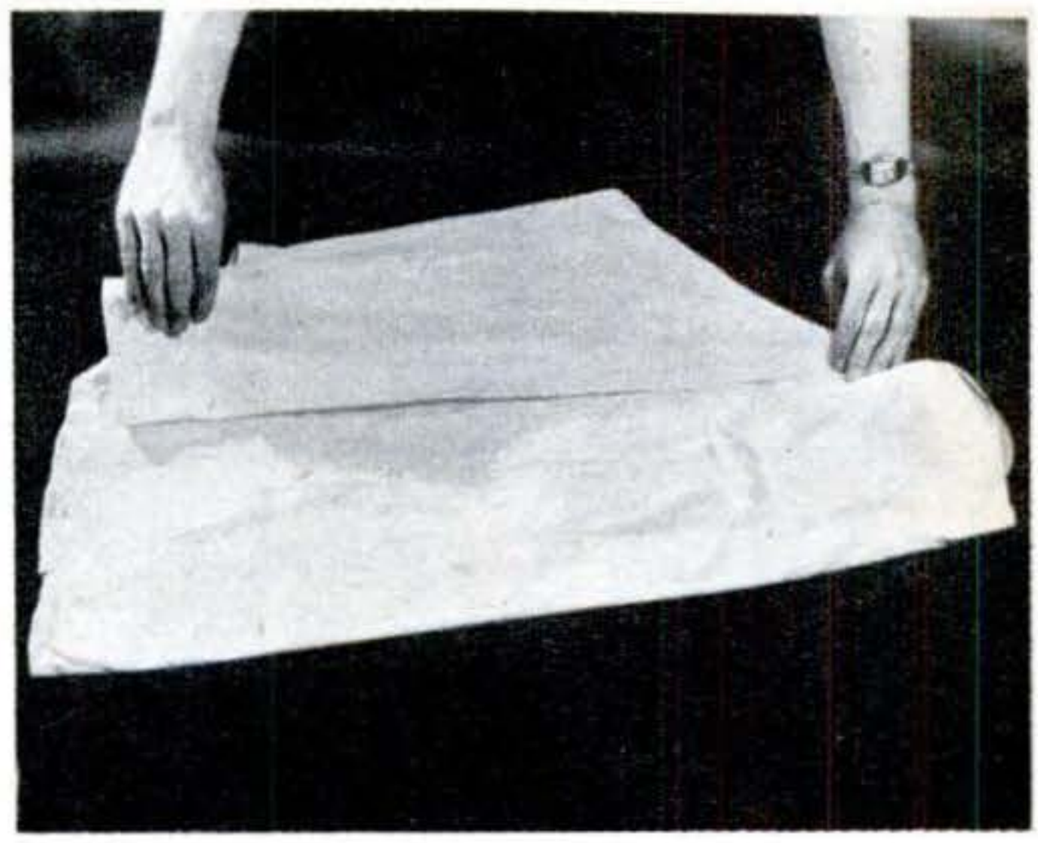




How to Find Your Correct Shirt Size

To FIND your neck size, measure at place where neckband normally rests as shown at left above. Add half an inch for comfort. Tape above shows 15½; model then should wear a size 16. Correct sleeve length is obtained by measuring from the center of your back near the neck to the end of sleeve. Tape (right above) shows the model needs a 34.

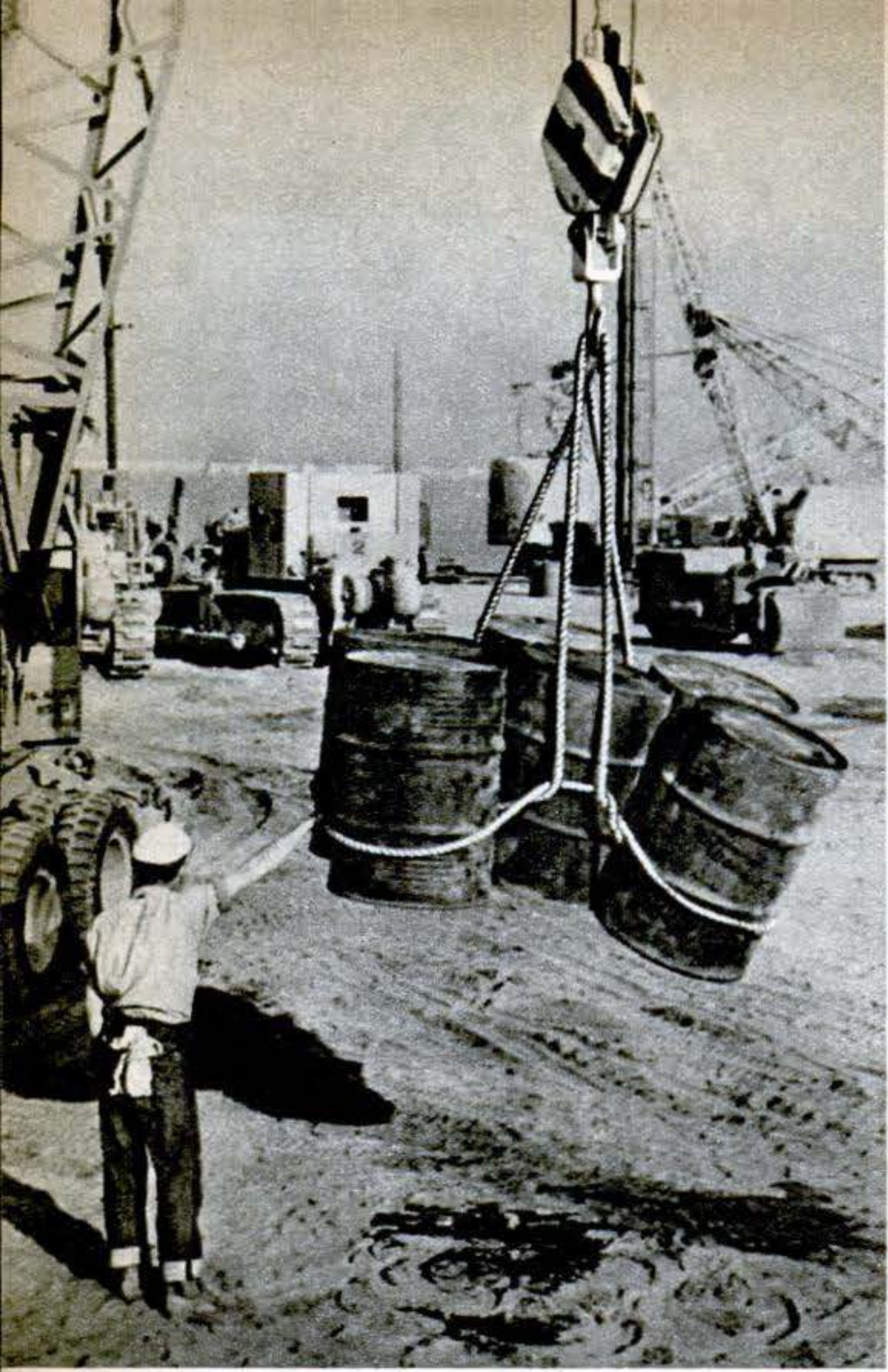


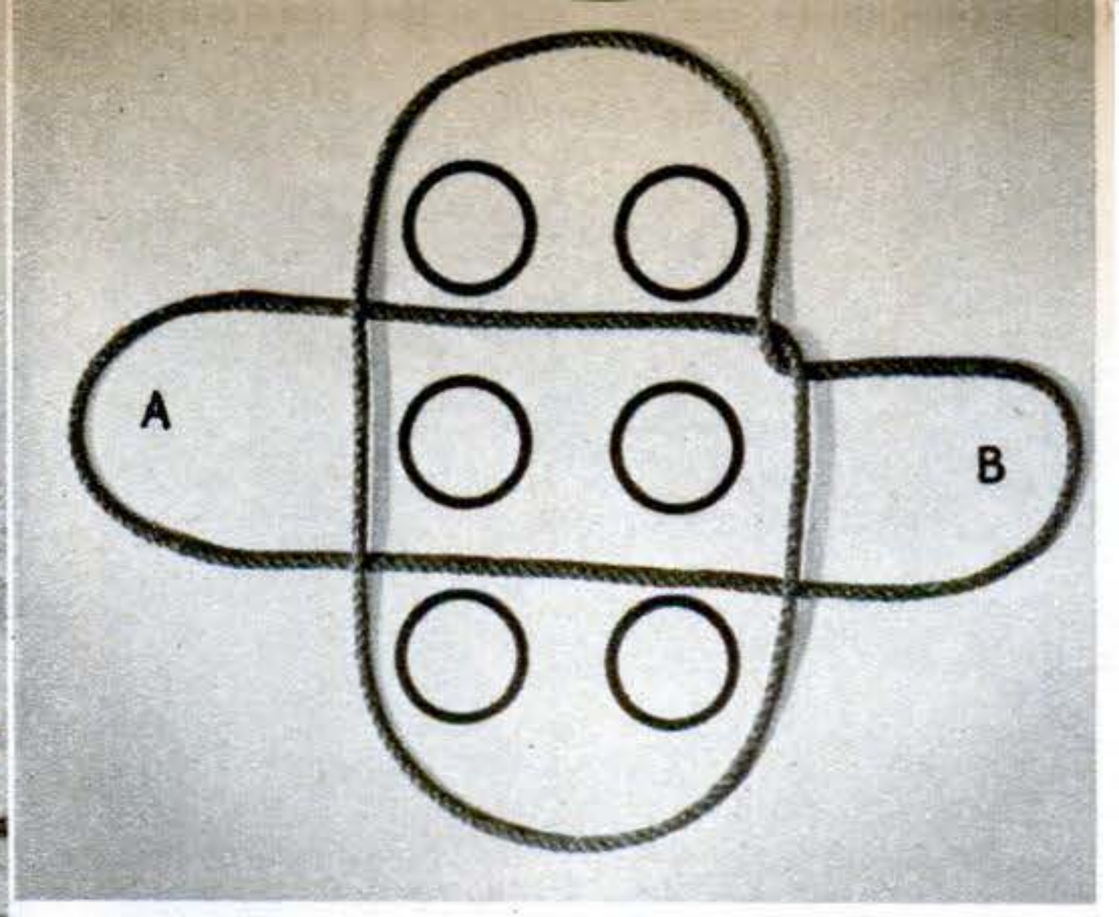


How to Fold a Shirt for Traveling

You will have more room in your suitcase and fewer wrinkles when you unpack, if you fold shirts as shown in these four photos. First, lay the shirt front down, folding back sleeves and part of shoulders, as at left above. Then fold the garment in three parts horizontally, as at right above. Starting with the tail, next fold shirt in four parts vertically, as at left below. Result, at right below, shows shirt ready for packing. Folding a shirt in this way also saves space in your bureau drawer at home.

Copyrighted material



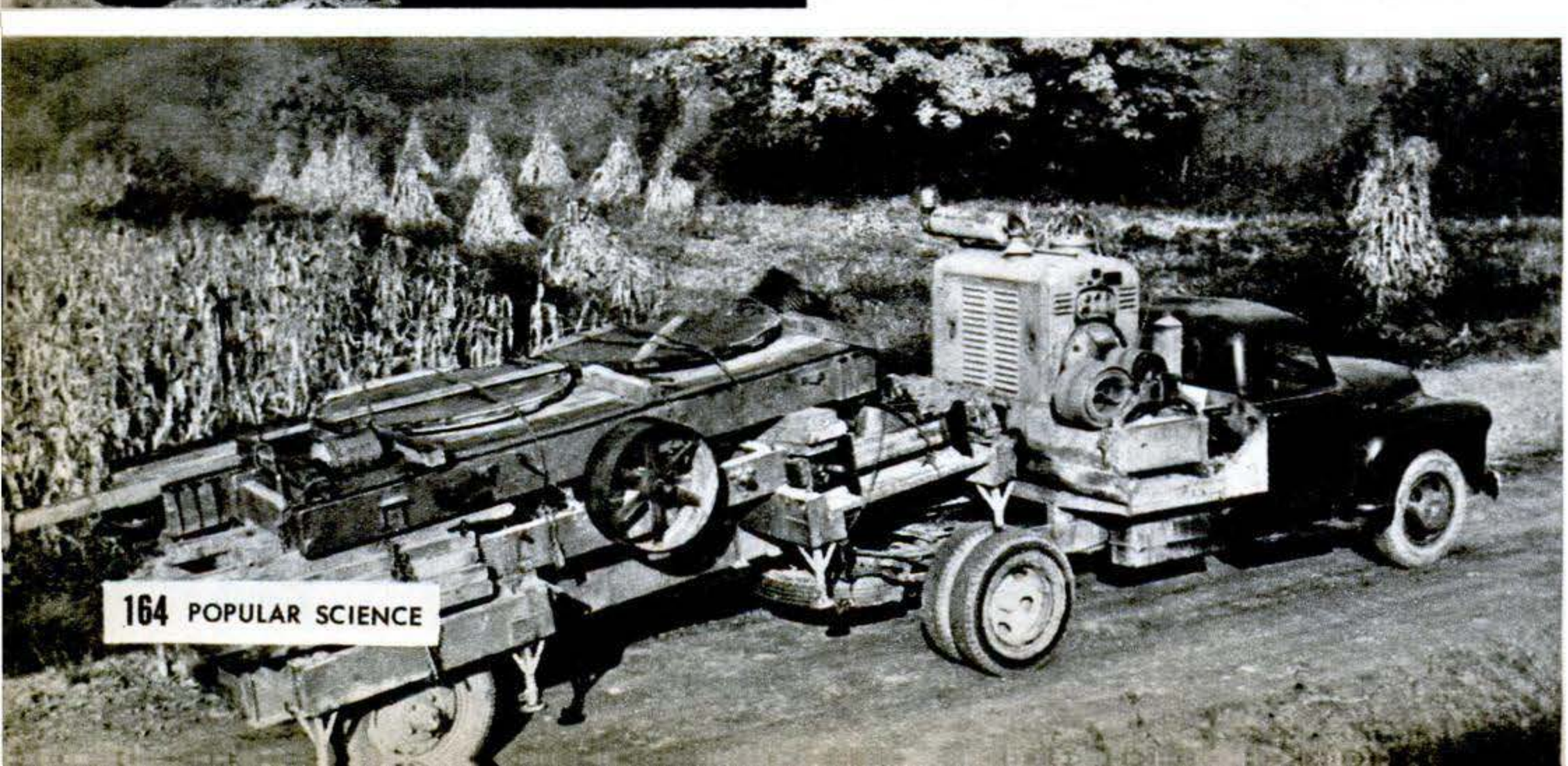


Trick Sling Lifts Six Barrels

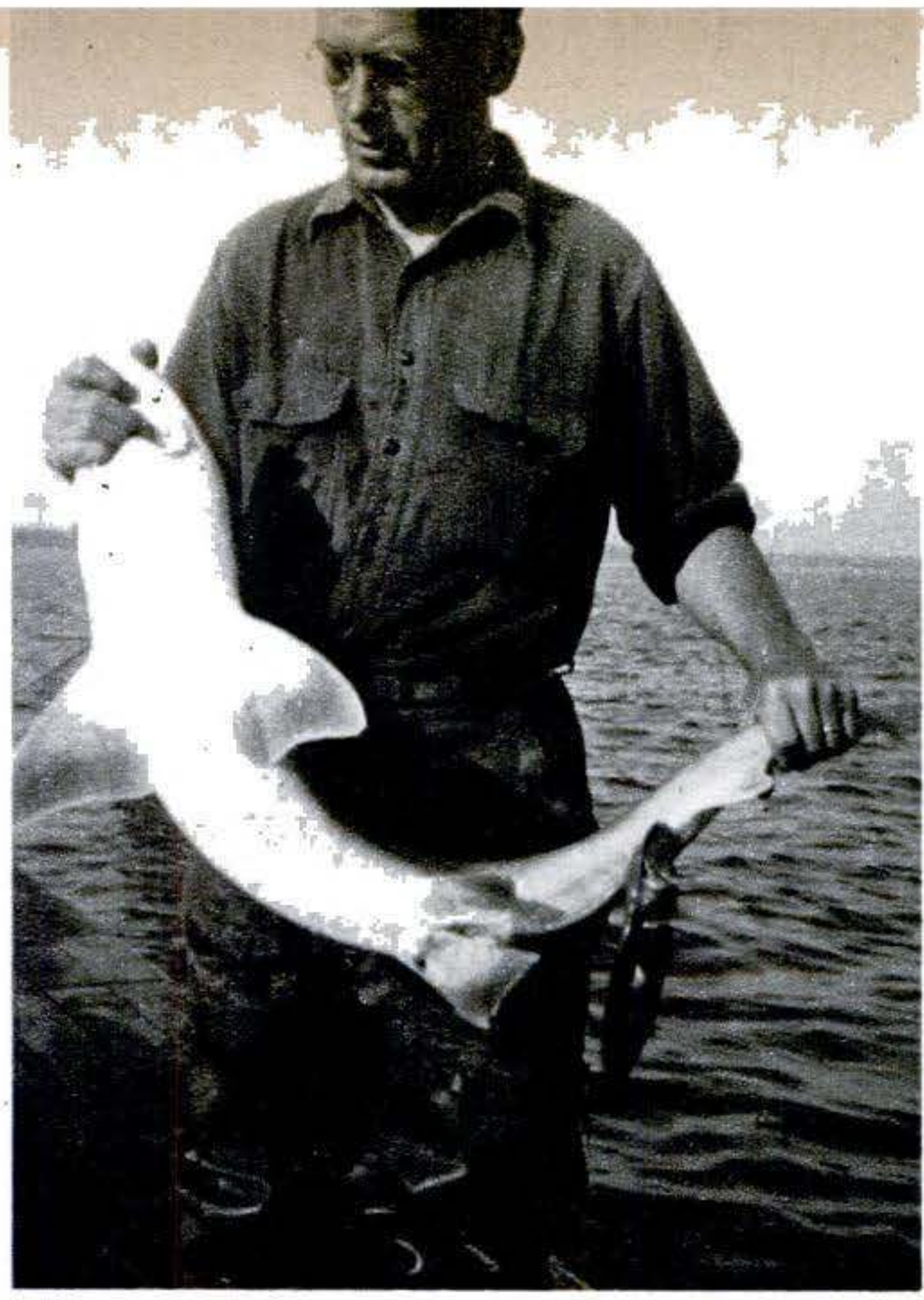
TRY picking up six heavy oil drums with a single loop of rope—and no knots, please. The Chinese invented the trick, and now it's saving time and work for the Navy's Seabees. A 30-foot-long, endless loop of 3-inch manila rope is arranged around the barrels as shown above. Loops A and B are then simply hooked onto a crane, as shown at left. The rope is kept tight by the drums' weight and can't slip off if looped below the barrels' bottom rings. Called the Chinese Barrel Sling, the method is said to be the fastest yet devised and particularly suited to loading at sea.

Mobile Saw Cuts Logs and Costs

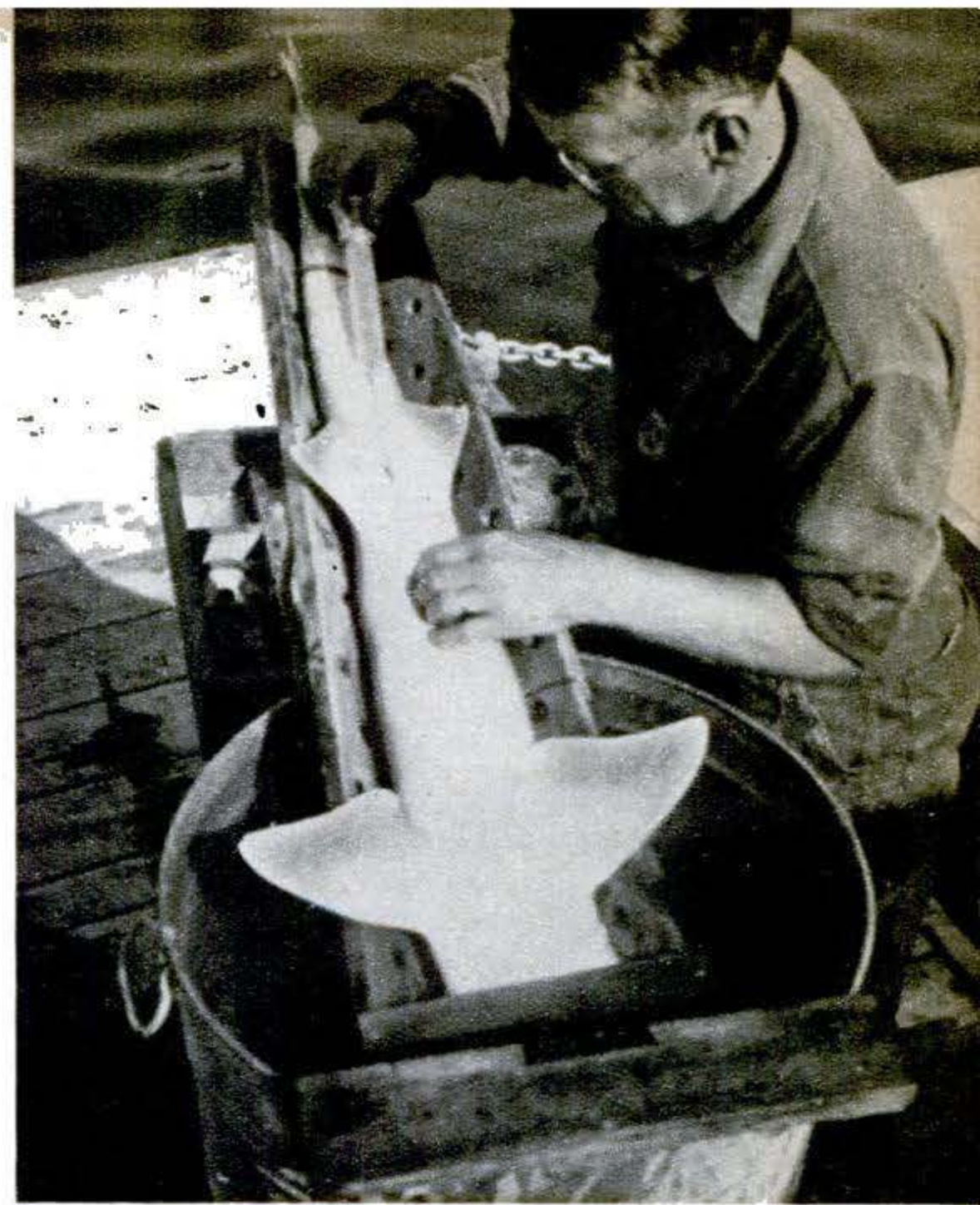
THIS mobile "sawmill" goes right to the trees, saving logging costs and making small jobs profitable. Assembled (left), it has a 56-inch blade and handles logs up to 18 feet long. Knocked down and packed on a trailer (below), it's only 32 feet long. In a day, it can saw 3,000 board feet of hardwood or 5,000 board feet of pine or poplar. Built by the West Virginia Agricultural Experiment Station, the sawmill can be set up in half a day and knocked down in 1½ hours. An 86-hp. Diesel engine drives the rig.



Copyrighted material



Professor Kempton demonstrates how to hold a dogfish that he has caught off pier at the Marine Biological Laboratory at Woods Hole, Mass. Balloon is to collect urine for kidney study.



For study, dogfish is tied belly-up to trough, head in tub of water to keep it alive. Water temperature and oxygen content must be just right. Here Dr. Kempton collects urine in syringe.

Dogfish Aid Medical Research

FISHERMEN hate dogfish, the littlest sharks, for their love of lobsters and fish. But they've found a friend. Biologists think they're useful—and extremely interesting.

For example, put a normally gray dogfish into a white-walled tank of sea water. Within two hours his hide will have bleached out close to white. Put another dogfish into a black-walled tank with no lights. Within two hours his skin will be extremely dark. Swap fish—and they'll swap color too!

Put blind dogfish into the two tanks, however, and nothing happens. The dogfish must see the color of his environment before he can change to match it.

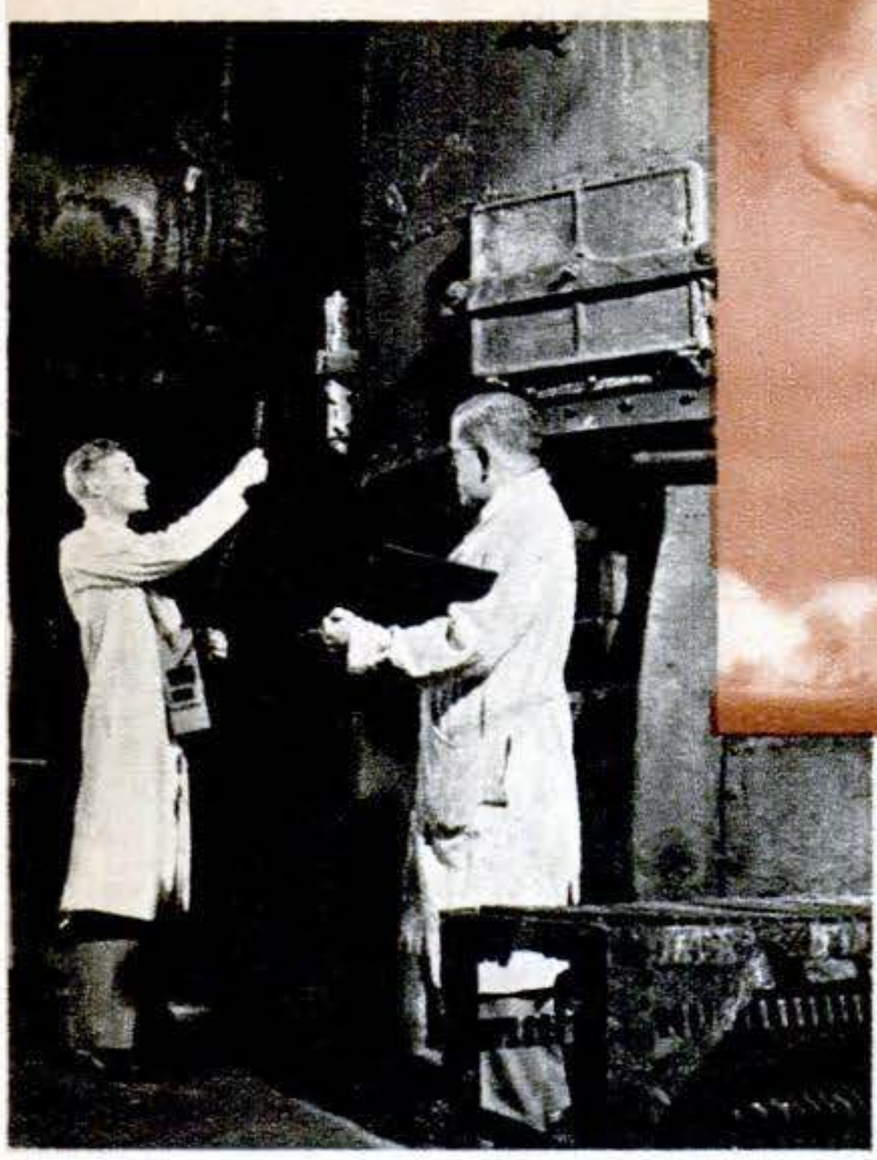
Prof. Rudolf Kempton, of Vassar, is studying dogfish kidneys. He hopes to find out more about the human kidney—although the dogfish kidney acts just the opposite.

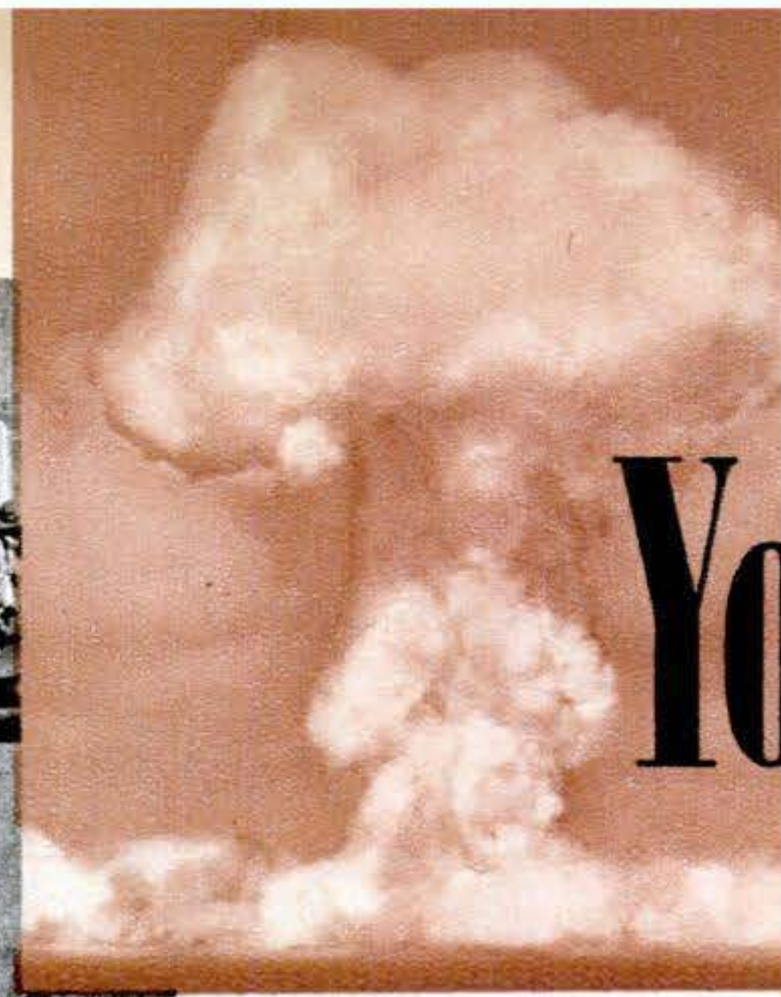
A human kidney works hard to get rid of urea. If it fails, an overabundance poisons the system. But the dogfish thrives on urea—the more the better. It keeps the fish alive by preventing his blood from being dissipated. So the dogfish kidney takes in blood and extracts urine.

How the fish makes the kidney do this is what Dr. Kempton is trying to find out.

Blood samples also are taken, as shown in close-up above. Fish are kept in well under pier and returned to it after examination and taking of samples. Blood and urine are analyzed in lab.

Copyrighted material





Your New

Instruments that warn of unseen rays are readied for mass output to meet needs of peace or war.

By Alden P. Armagnac

Geiger counter can measure the level of molten metal in foundry cupola, as above—or map radioactive contamination after an A-bomb blast.

FROM a box resembling a radio cabinet comes a string of sharp metallic clicks like those of a telegraph sounder—infrequent at first, then in rapid succession.

That is the atomic-age alarm. More and more people are hearing it. Some day your own safety may depend on it.

The chattering noise comes from a Geiger counter, one of the principal instruments used to locate radioactive substances. Lack of any human sense to detect the invisible rays makes them necessary. About 60,000 radiation detectors are being used today on Government atomic projects alone. Once physicists had to invent and build these devices to suit their purposes. Now two dozen American firms make complete instruments, and others produce their components. About four million dollars' worth of them were produced last year, and increasing applications are multiplying the demand for them.

So manufacturers are now preparing to turn out tubes and other parts for them by the tens of thousands, like components of radio receivers; and soon Geiger counters are expected to be in mass production. Besides meeting peacetime needs, assembly-line manufacture of radiation detectors will solve the problem of supplying the enormous number that would be needed in an atomic war.

Twenty-three varieties of radiation detectors, a representative array of the latest models, recently were exhibited by the U. S. Atomic Energy Commission at a conference of electrical and radio engineers in New York City. One of the newest, a "scintillation counter" with a light-sensitive photo tube that responds to luminous scintillations of a crystal, excels at registering neutrons. The AEC calls it "the most important advance in radiation-measuring instruments for nuclear research" made during 1948. Because the neutron has no charge, the ordinary Geiger counter will not detect it effectively.

You can take your choice of other models especially suited to detect alpha, beta, or gamma rays. Some employ a Geiger tube, a device in which radiation causes a sudden, brief electrical discharge between a charged wire and an encircling metal cylinder—with a resulting click when the pulse of current is amplified. Others use an ionization chamber, a form of electrical condenser whose charge gradually leaks off on exposure to radiation and is measured by an indicator on the scale of an electroscope. Many go by fanciful nicknames—"Juno," "Zeus," "Cutie Pie," "Walkie-Squawkie," and "Pocket Screamer."

All these varied models, however, can be simply classified according to purpose:

1 **Radio-chemical analysis.** Geiger counters that detect the rays of radioactively tagged substances, in medical and chemical "tracer" experiments, belong to this

Copyrighted material

Eyes and Ears

group. They may be elaborate affairs with such refinements as automatic dials, like mileage meters, to record the total number of clicks. These research-type models are not usually intended to be carried about.

2 **Health-physics survey meters.** These are designed especially to be carried from place to place. Non-experts may use them to locate radioactivity. In trained hands, they also serve to measure its intensity. Prospectors employ them to find uranium-bearing minerals. Health-physics experts use them to test the radiation from uranium piles and other "hot" spots in atomic projects and make sure that workers and dwellers nearby are not endangered. In atomic warfare, these would be the radiation detectors rushed to the scene of an atom-bomb explosion to re-

Full dress for a radiation sleuth includes a combat-type mask to avoid inhaling radioactive dust, protective coveralls, and a long "fish-pole meter" to test objects for radioactivity at a safe distance. He carries an electroscope-type meter in other hand, and wears two pocket meters and a sensitized-film badge to check on how much radiation strikes him.

Copyrighted material

veal the areas contaminated with radioactivity.

Where radiation is intense, a pistol-grip hand instrument of the ionization-chamber type, the "Cutie Pie," is considered the most reliable survey meter. Others using Geiger tubes, however, are the most sensitive. Slung from a shoulder strap, a typical Geiger-counter survey meter consists of an oblong case about the size of a worker's lunch box, with a short flexible cable leading to a shiny metal baton. Wielding the baton in his hand or on a pole, the surveyor uses it to test objects for radioactivity, watching a dial on the case or listening with a headphone. Designers have been making strides in reducing the size and weight of survey meters.

The smallest of all, a tiny meter small enough to fit in the pocket and called the Audeton®, uses no batteries. A built-in, spring-operated generator supplies power to charge a condenser that operates a Geiger tube about the size of a cigarette for nearly two hours. You wind up the generator by pulling a knob attached to a drawstring. The earphone is a midget hearing-aid button.

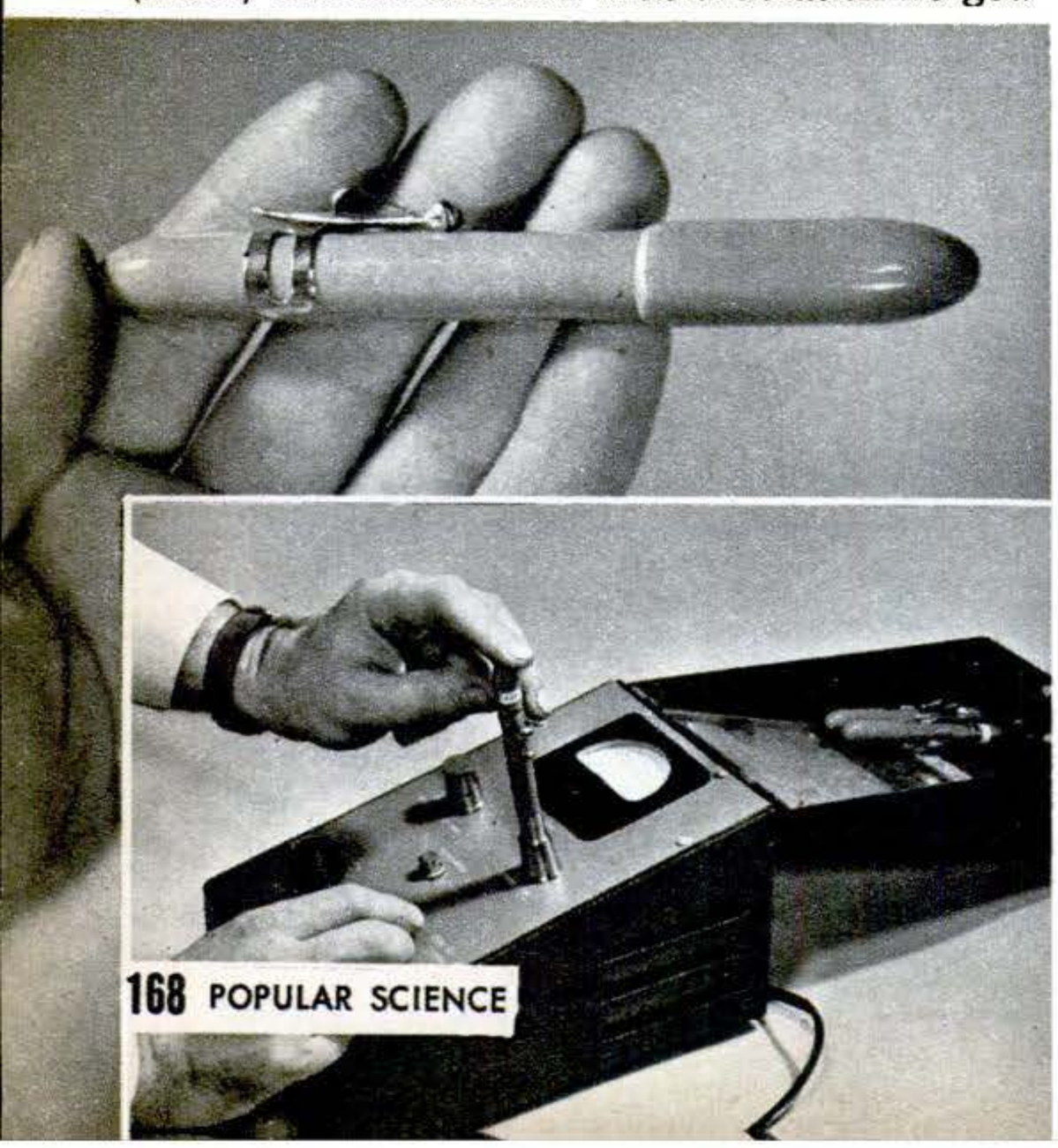
Another novelty, recently proposed, is an attachment that would convert any home radio into a stationary or portable radiation detector. This might have emergency application in wartime. According to William D. Schafer, of the Los Alamos Scientific Laboratory, it could consist simply of a suitable Geiger tube with an adapter plug fitting into one of the set's regular tube sockets. The radio set would serve as the amplifier, and its loudspeaker would make the signals audible. Problems of manufacturing such a device remain to be worked out.

3 "Personnel-monitoring" detectors. While survey meters tell a user how "hot" the surroundings are, personnel-monitoring meters reveal what concerns him most of all—how much radiation his body actually receives.

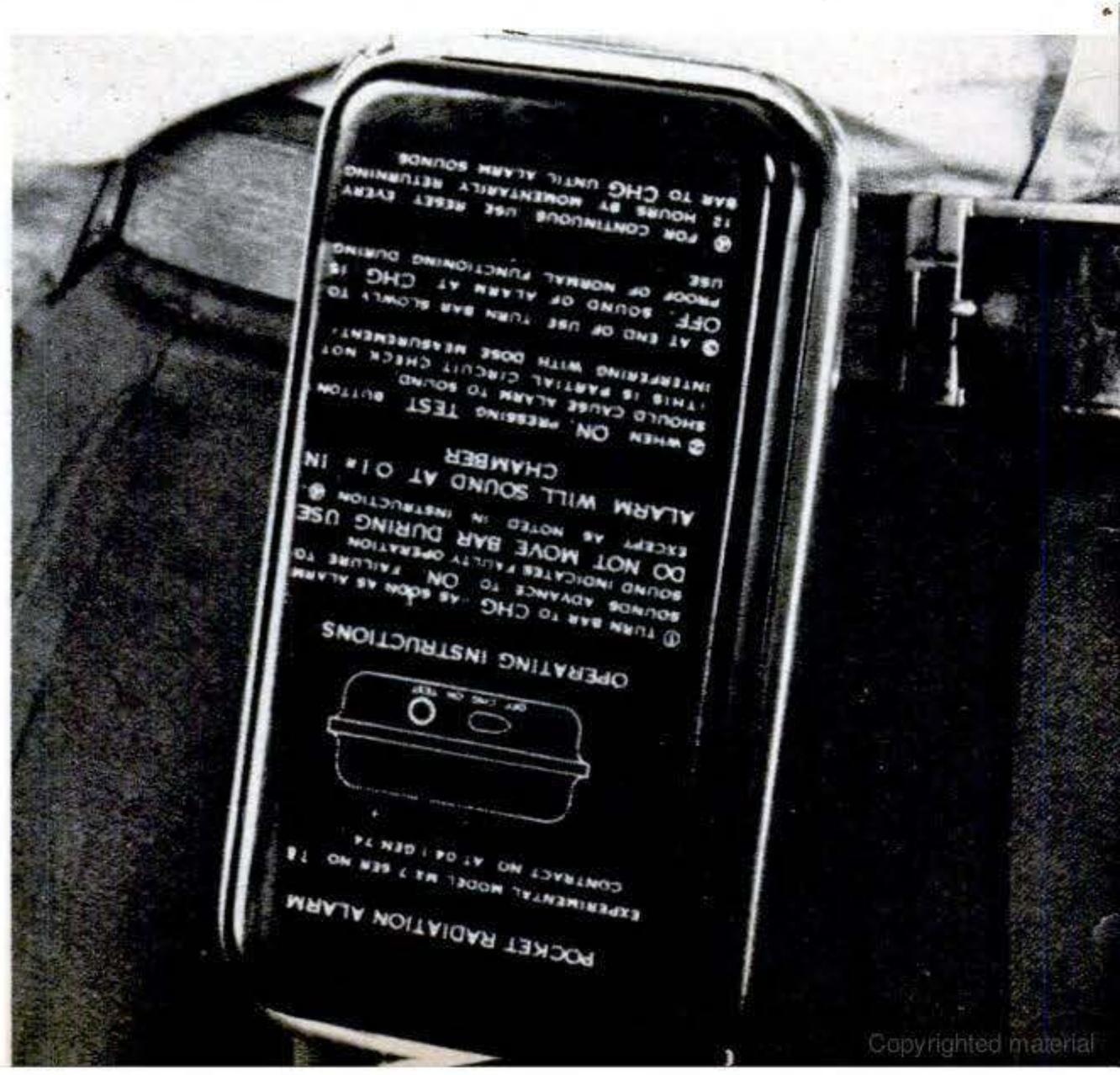
Human exposure to radiation is measured in units called roentgens. One-tenth of a roentgen per day has long been the accepted safety limit for workers regularly exposed to radiation in peacetime pursuits. This has been considered the maximum that the body can tolerate over long periods of time—say, 20 or 30 years—with assurance of no ill effects. Expert opinion now favors a limit of only three-tenths of a roentgen per six-day week, half of the figure above, to give an even greater safety factor.

No apparent ill effect results from far greater doses of radiation, however, if exposure is brief. Then it takes at least 50 roentgens to cause even mild nausea or "radiation sickness," from which recovery is complete. A fatal dose is as large as 200 to 600 roentgens. Therefore troops and civil-defense workers who might be called upon to expose themselves to radiation in a wartime emergency could safely use much higher tolerance limits than regular peacetime workers. But they, too, would need personnel-monitoring

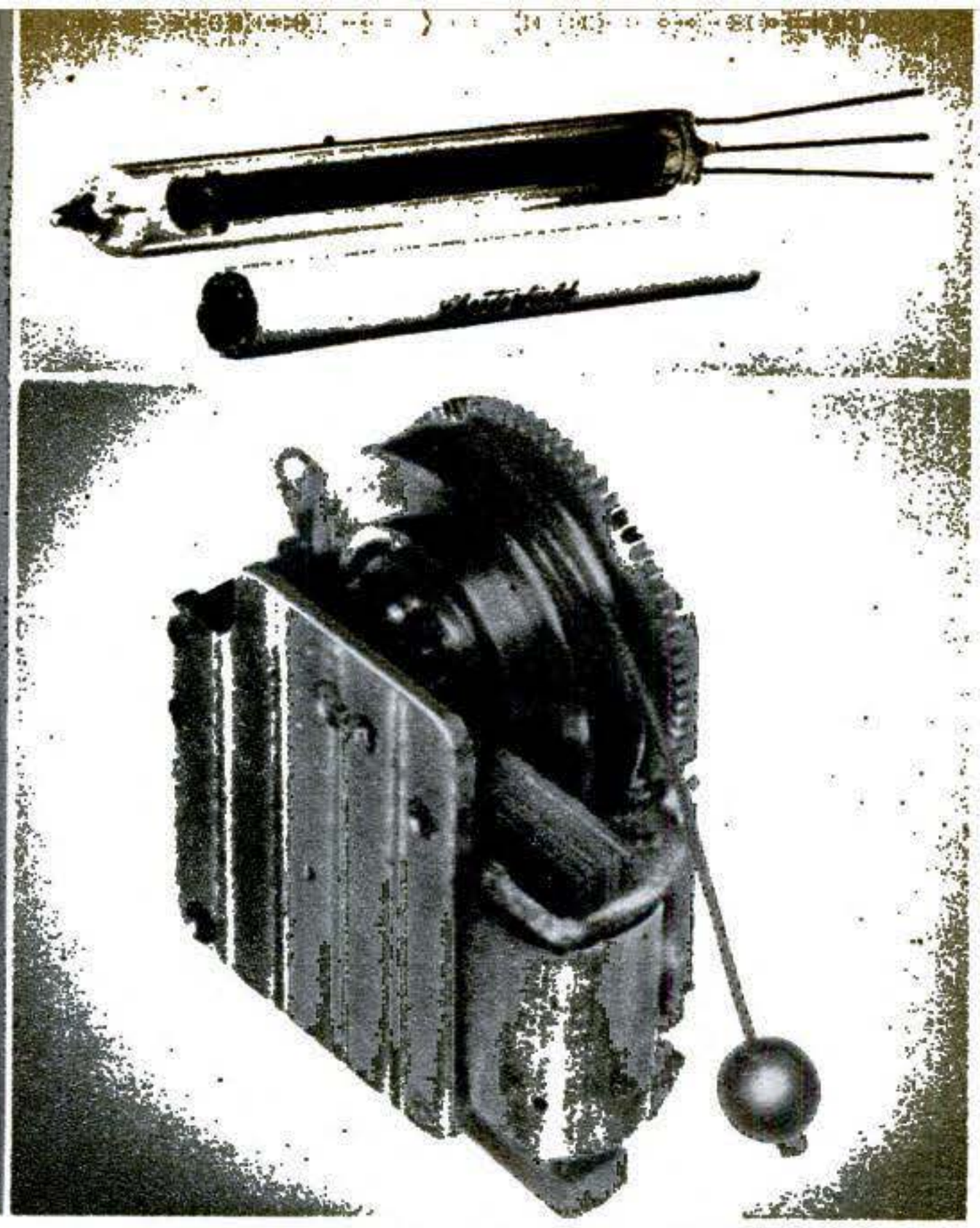
Resembling fountain pen, this "pocket chamber" (below) is worn by worker in "hot" area. At end of day it is placed in measuring instrument (inset) that reveals how much radiation he got.



"Pocket Screamer" worn on belt automatically sounds an alarm, warning user to get out of danger zone, when his exposure to radiation reaches the limit he can safely absorb daily.



Copyrighted material



Miniature radiation detector above gives audible signal through hearing-aid button worn in ear. View at upper right compares size of its tiny Geiger tube to cigarette. Pulling knob at end of drawstring works built-in generator, lower right, that makes batteries unnecessary.

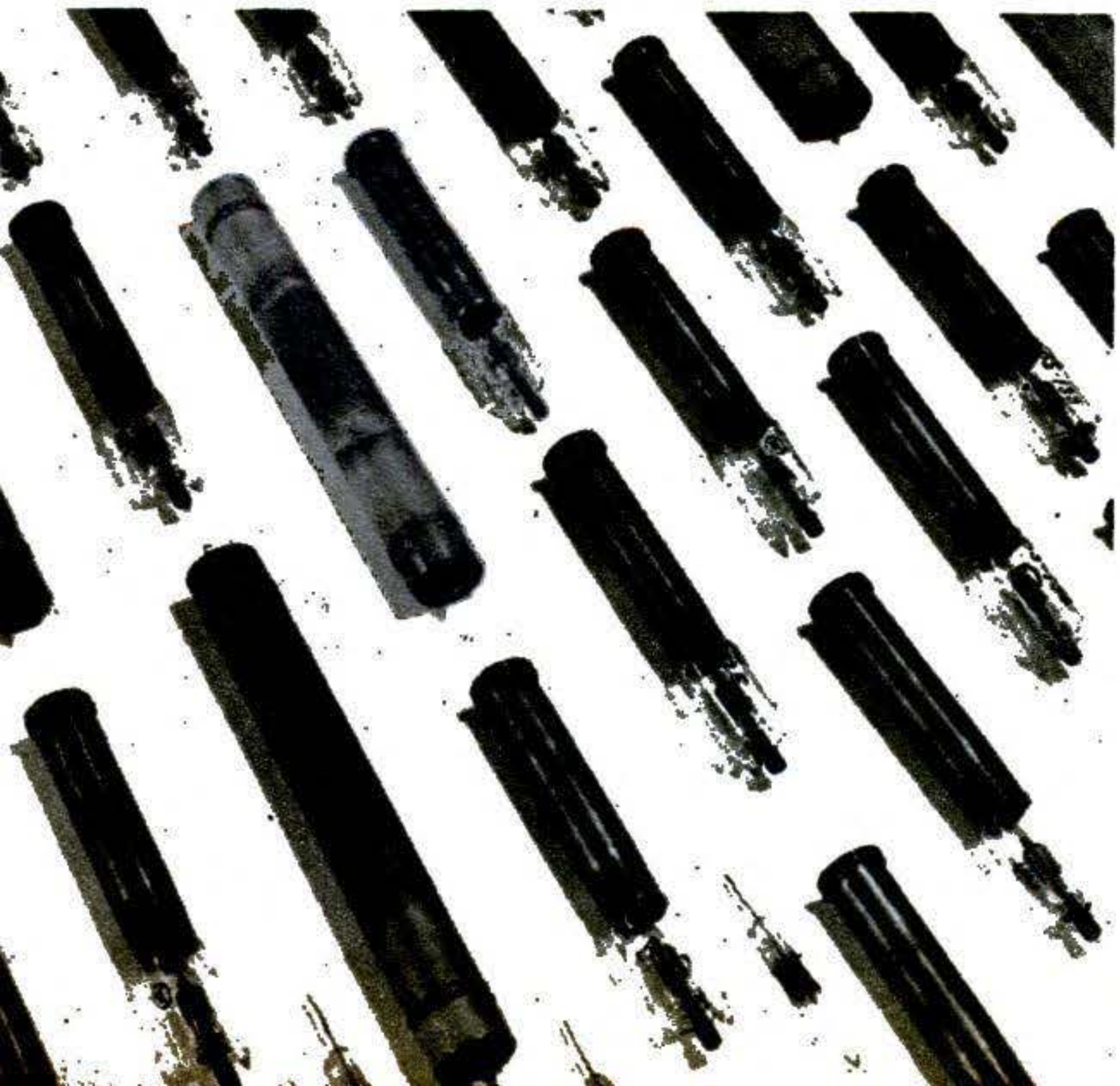
radiation detectors to warn of reaching this limit.

Badges or finger rings containing X-ray film, darkened by radiation, are among the simplest of personnel-monitoring devices.

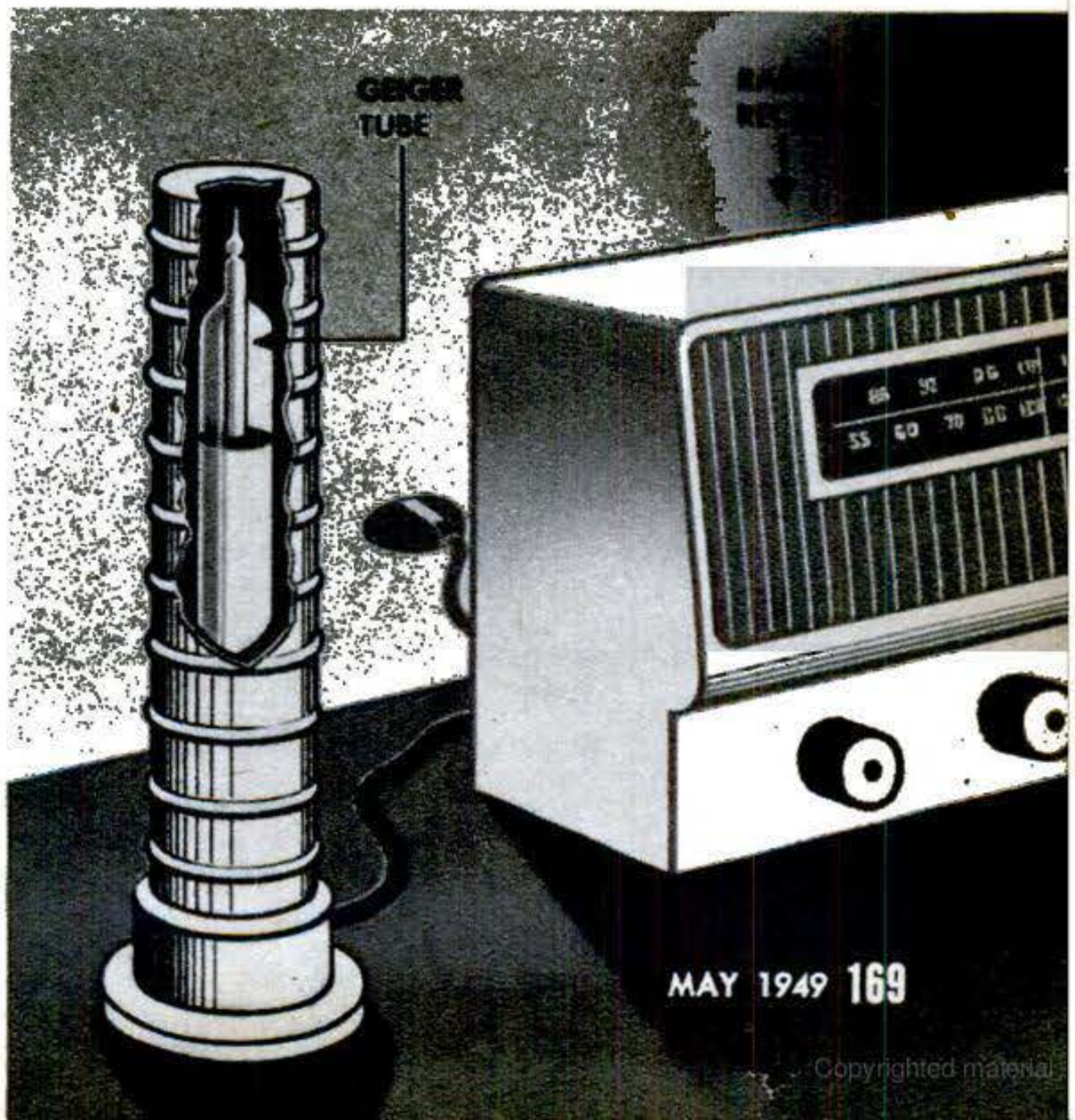
Meters worn on the clothing may be as small as fountain pens, which they resemble. These are miniature ionization chambers. In one type a moving hairline, on a tiny scale, gives a direct reading. Others, more rugged and better suited for untrained users, must be placed in a separate instrument for reading. Still needed has been a compact instrument that would give a positive warning when the tolerance limit was reached.

The new "Pocket Screamer" does this. Clipped to the belt or carried in a pocket, it contains a midget ionization chamber. When radiation discharges it to a preset level, a relay closes automatically and sounds an alarm buzzer—warning the wearer to get out of the "hot" area. END

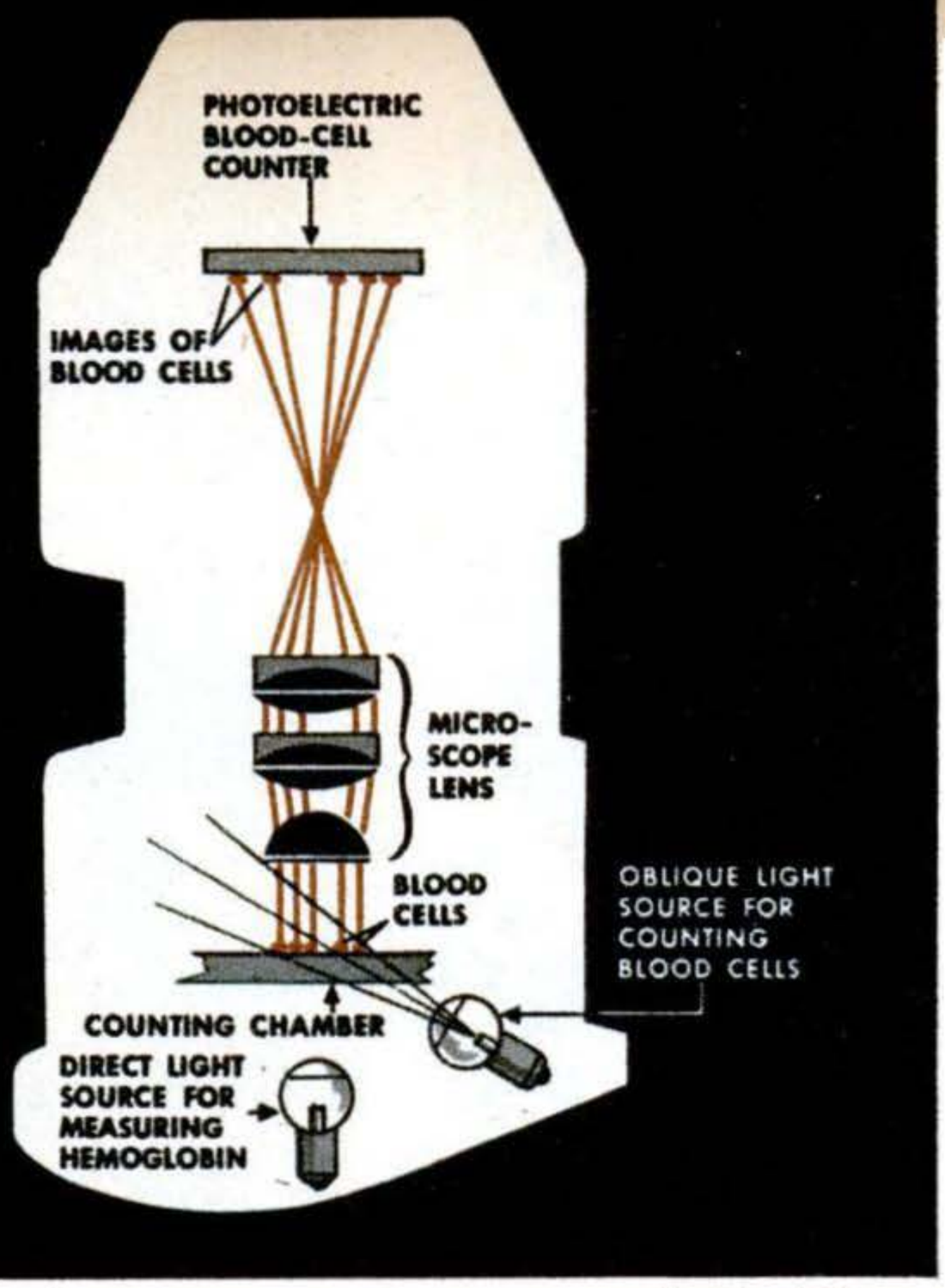
Mass production of radiation meters is on the way as makers develop precision manufacture of parts in quantity. Here is an array of Geiger tubes from Westinghouse plant at Bloomfield, N. J.



Even home radios might be converted to radiation detectors by attachment like this, according to a recent proposal. Idea awaits commercial development of a Geiger tube suited to purpose.



Copyrighted material



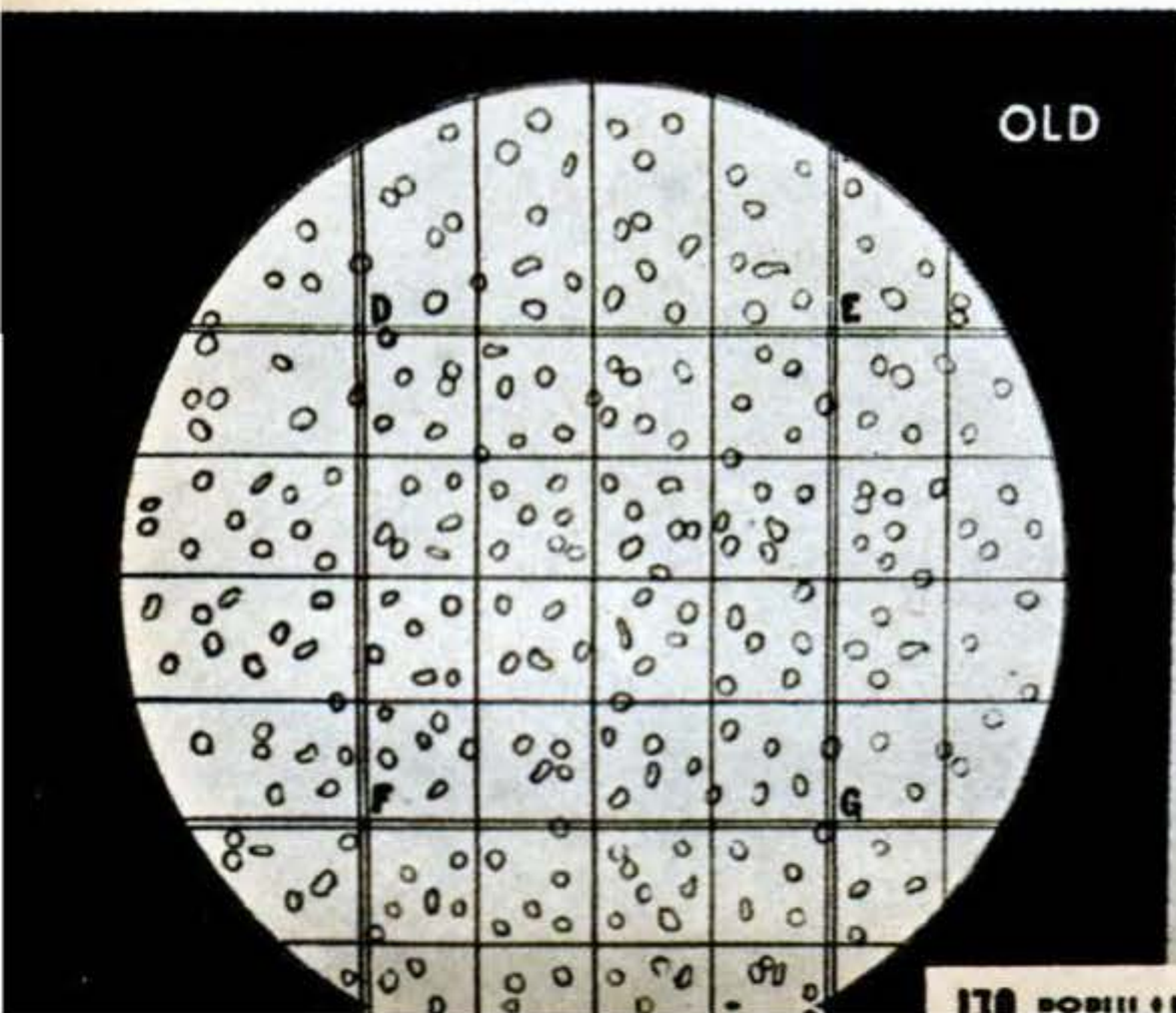
Automatic counter instantly tallies corpuscles in blood sample inserted at left. Oblique lighting makes them bright against dark field, and total light reaching photo cell depends on their number. Separate specimens, prepared with different solutions, are used for red and white corpuscles. Latter specimen is also used, under direct lighting, to measure the hemoglobin content.

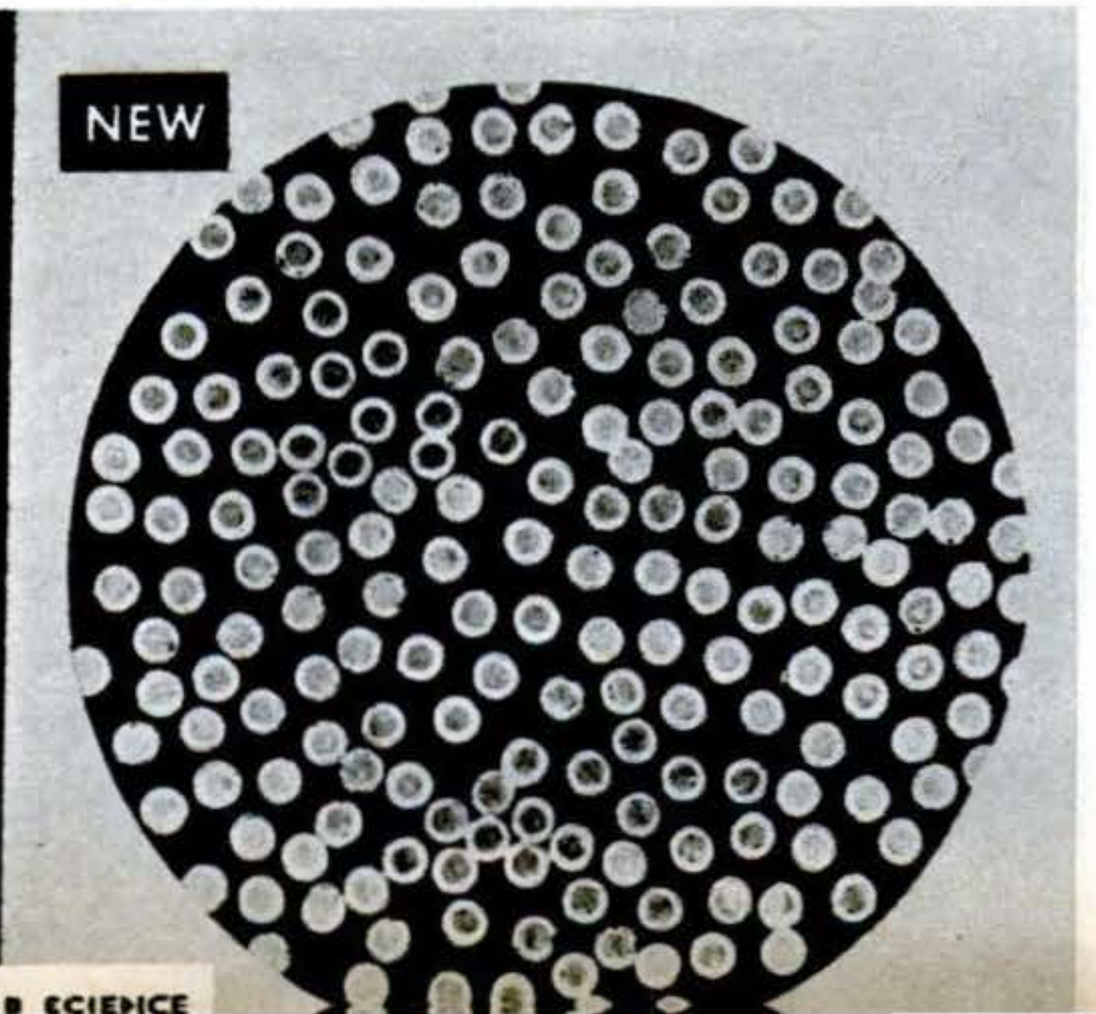
Photo Cell Counts Blood Cells Faster

A NEW microscope with a built-in photo cell makes blood counting speedy and automatic. With it, any nurse or office assistant needs only 15 seconds to count red and white blood corpuscles in a blood sample and measure its hemoglobin. A trained technician, using a conventional microscope, requires 15 minutes for the task. The sketch above shows how the Photomicron® works.

The new device should prove invaluable in busy clinics and hospitals where large numbers of blood counts are a daily routine. For doctors in localities distant from a large city or hospital, it will provide blood-testing facilities unobtainable before. The Photomicron could also play a vital role in such an emergency as an atom-bomb attack. This would require rapid blood tests on an unprecedented scale for treating radiation injury.

Drawing at left, below, shows how red corpuscles in standard counting chamber look to technician at microscope, who must count the number within a ruled area one by one. Drawing at right shows how they appear, in the new instrument, to a photo cell that gives an instantaneous tally.





Copyrighted material

More Wind for Wind Tunnels

MAN-MADE cyclones, 10 times more powerful than nature's, will be everyday work for this big Westinghouse air compressor. Driven by two 25,000-hp. electric motors, it will whip up 1,500-m.p.h. gales in a new supersonic wind tunnel at the Ames Aeronautical Lab at Moffett Field, Calif. Each of the eight giant disks on the 123-ton rotor above is 12 feet in diameter and four inches thick. Two-foot-long, propellerlike blades on the toothed rims will blast 1,000,000 cubic feet of air a minute through the tunnel.

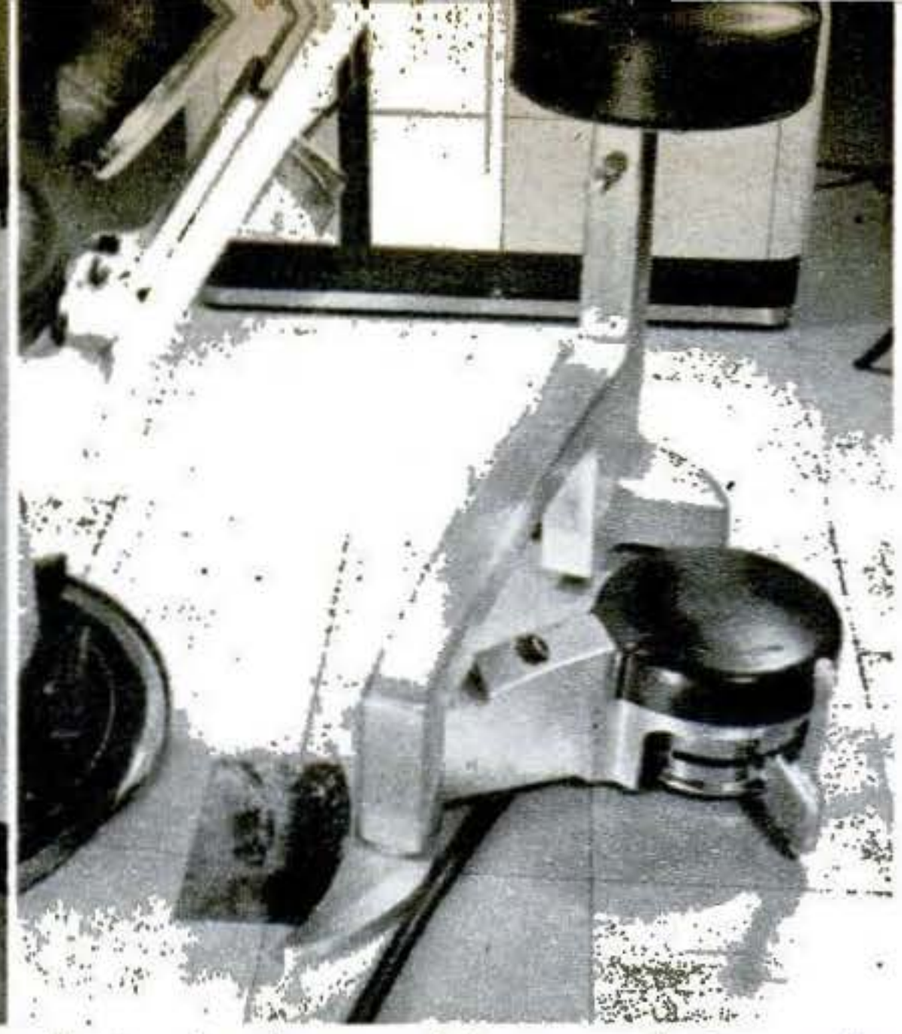
Light Guides Driverless Truck

THIS new materials-handling fork truck can start, stop, back up, turn around, and raise, lower, and tilt its cargo boom—all without a driver. By varying the frequency of pulses of a light beam with a stroboscopic disk, an operator at a distance (hidden in picture below) can make the truck do nine separate jobs. Photo cells on the truck translate the light into electrical impulses that actuate hydraulic controls. The Automatic Transportation Co. built the truck—but only as a special exhibit: no production is planned.

Retractable Skeg Aids Barge

A SIMPLE trick long used in small sailboats with centerboards is helping to make cargo barges more maneuverable. The new barge below has a small, retractable skeg on one end. In pull-towing, the skeg is lowered to keep the barge from yawing; in push-towing, it is raised out of the way. The other end is squared off so two of the barges can be butted together and towed as a single unit. Designed by Butcher-Arthur and built by Dravo, the barge is 240 feet long and can carry 2,500 short tons of dry cargo.

Copyrighted material

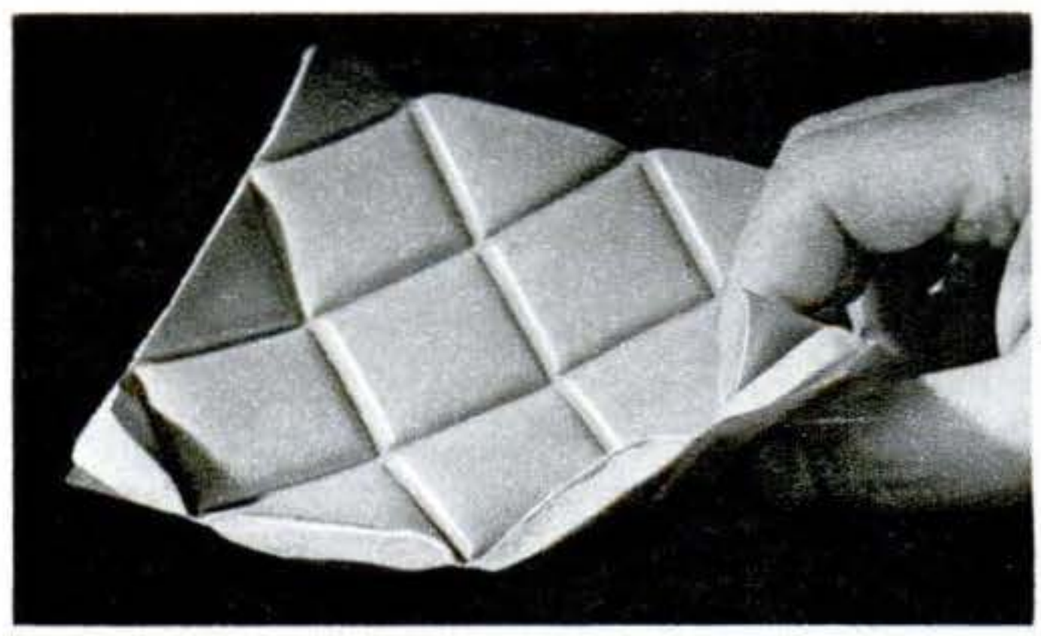


Stool Lightens Dentist's Work

DR. CARROLL JOHNSON, a Chicago dentist, is shown using the Rota-Seat® he invented to let him work sitting down. As seen at right, above, the rubber-wheeled stool is hinged to a plate that anchors under the patient's chair. As the stool is moved, it carries along a footrest with a drill-control pedal. Varying the relative positions of chair and stool, adjusting their heights, and sitting side-saddle or astride the eccentric-swiveled seat positions it for 80 percent of all dental operations.

Plastic Quilted for Upholstery

AT right is a new kind of upholstery, made by electronically heat-sealing a sandwich of fire-resistant filler between two sheets of Vinylite® plastic. This method of quilting is quicker than stitching and produces a material with a tough surface that is easily cleaned. Called Sealtuft®, it can be used on furniture, in automobiles, and as a decorative wall covering.

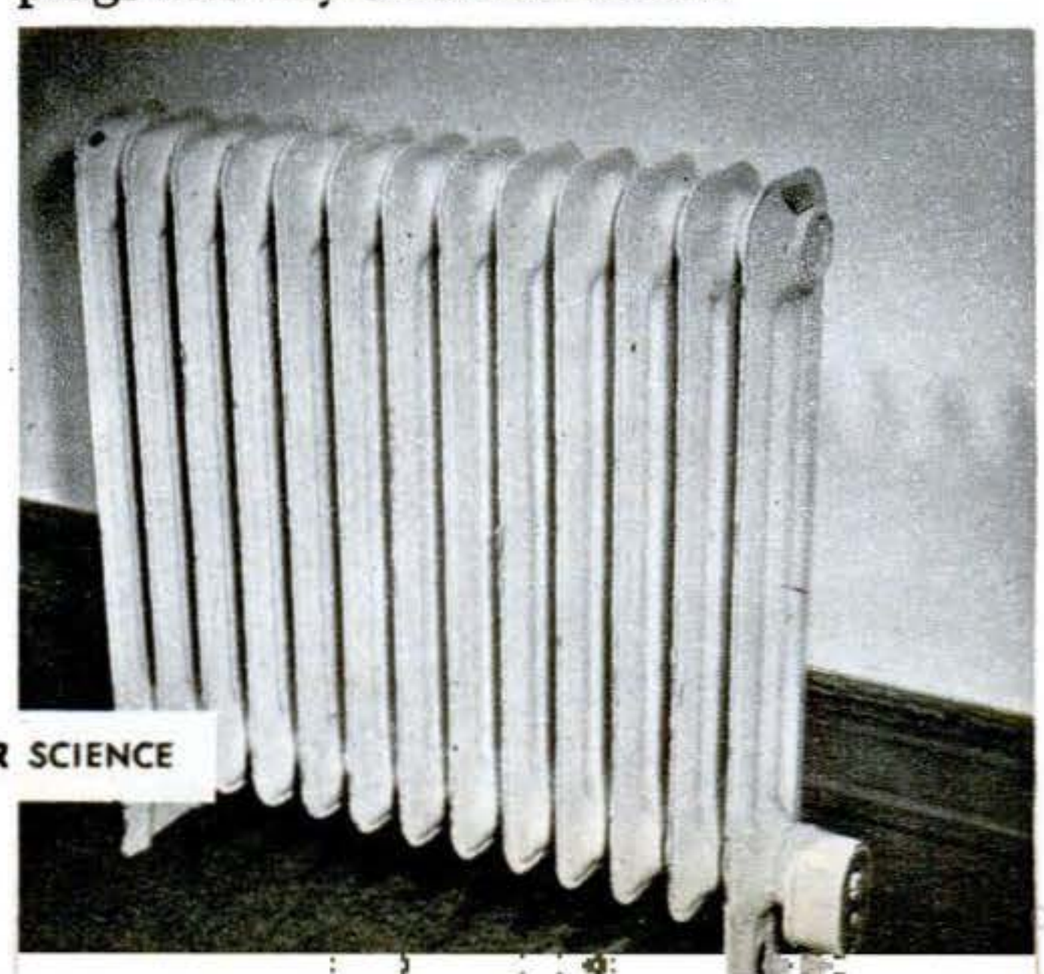


Books Read from Microcards

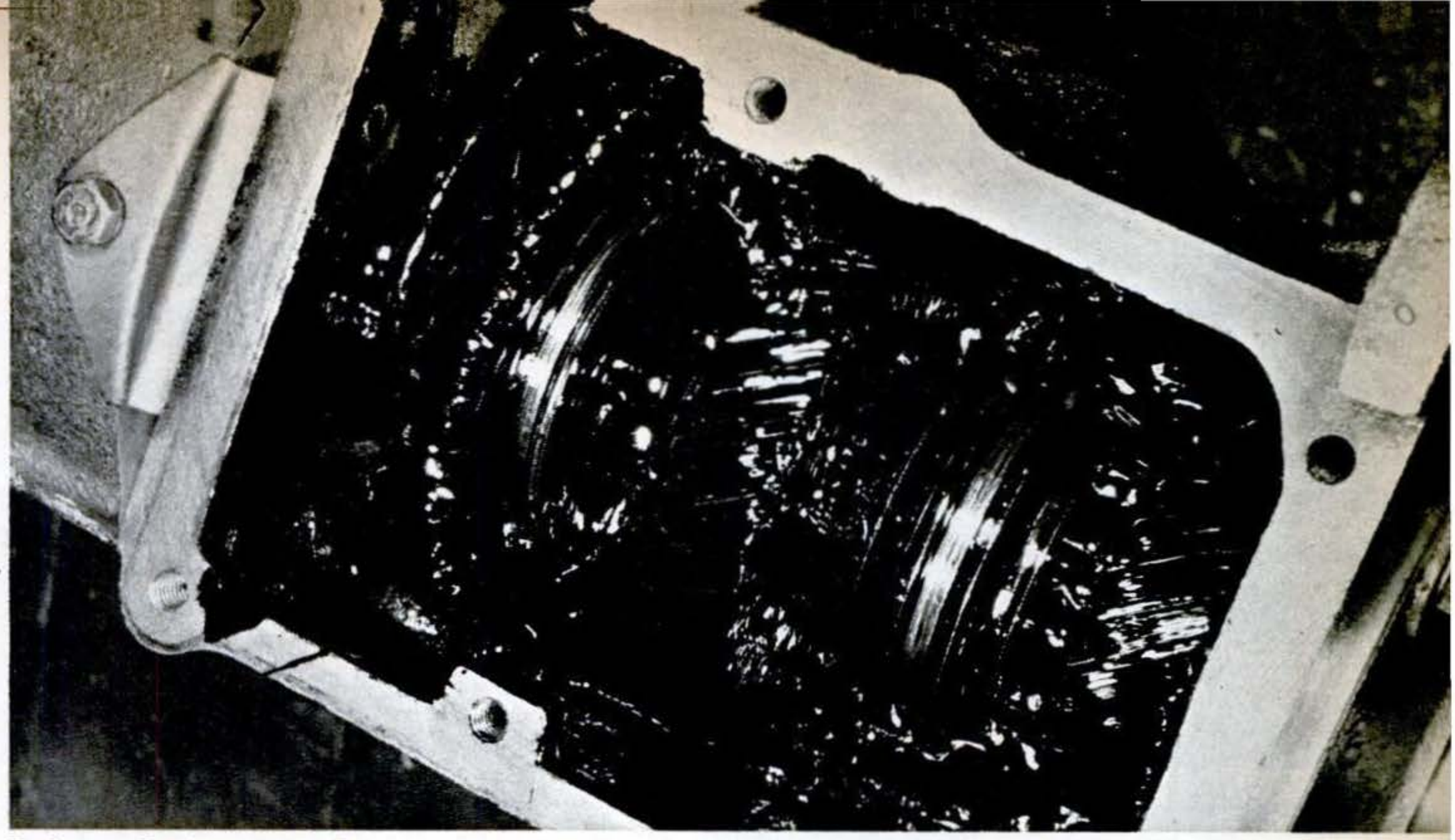
To save library space, books are now being copied photographically in microprint on file cards. For reading, a card is put into the Micro Library Reader® below. This magnifies the image 24 times in projecting it on a screen. Each 3- by 5-in. card—a fine-grain photographic print—holds 30 to 200 pages of text, depending on original size.

Electricity Heats Oil Radiator

THIS liquid radiator (below) needs no central furnace, plumbing—or safety valve. It is heated by electricity and, instead of water, contains a permanent, sealed-in supply of low-expansion, heat-retaining oil. Made of pressed steel, the Hurseal® unit is light enough to carry from room to room and plugs into any electrical outlet.



Copyrighted material



Before: Grease-covered transmission to be cleaned is seen with inspection plate removed.

Vaporizer Degreases Machinery

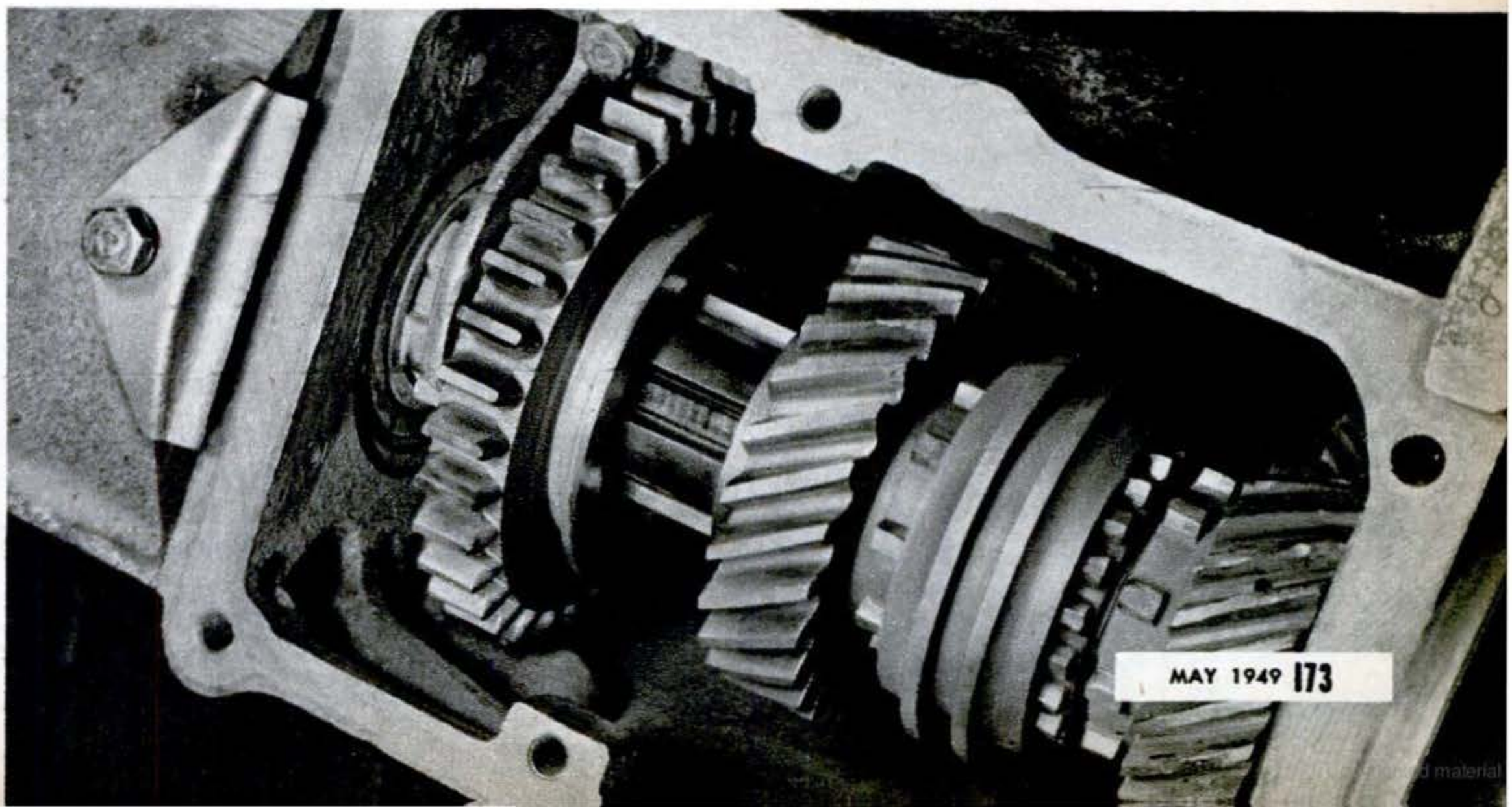
Ten seconds in chemical steam bath leaves transmission gear as clean as white shirt just back from laundry.

By Ray Milholland

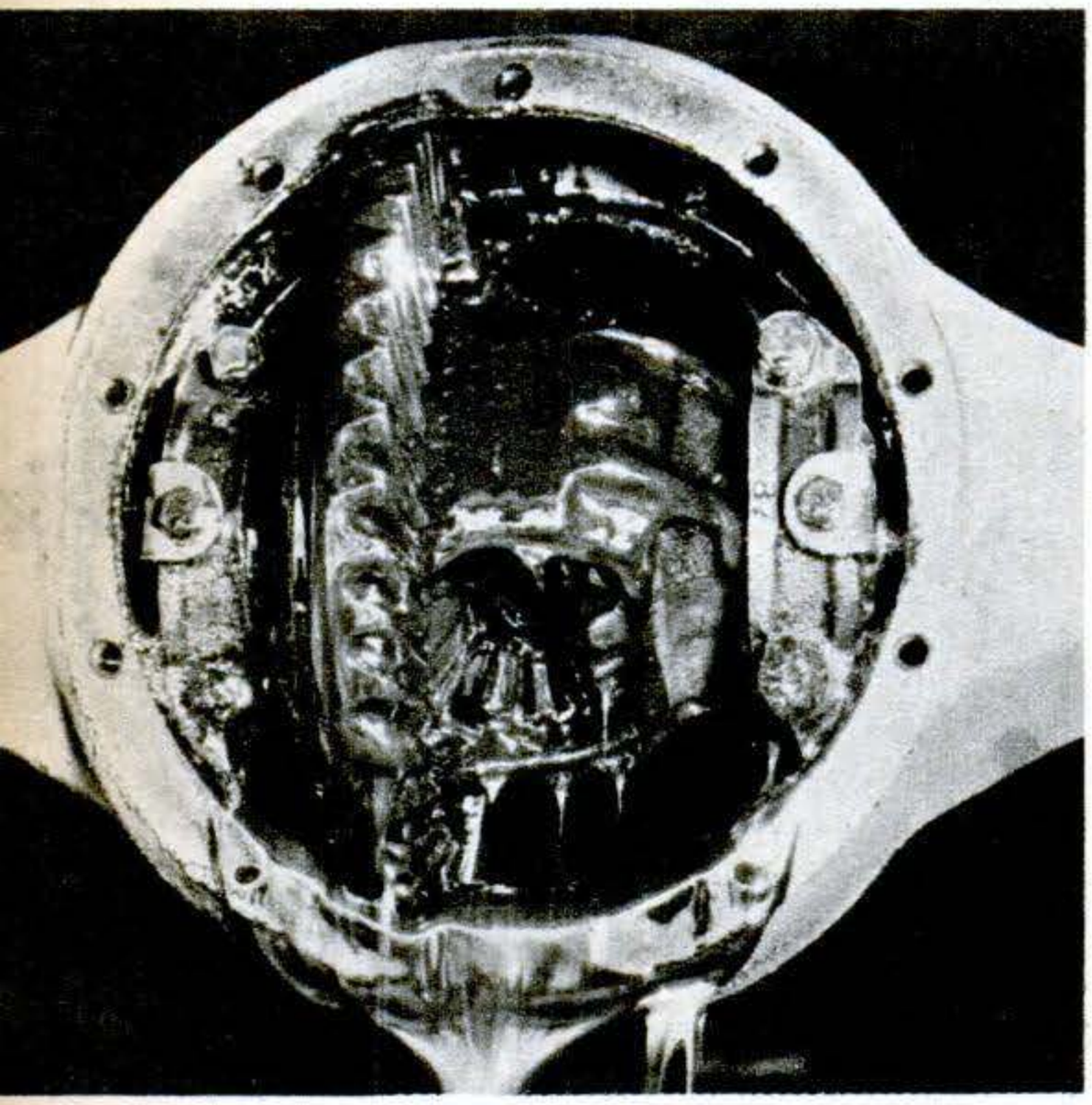
WASHING heavy oil or grease off an automobile transmission gear by condensation of the vapors of a volatile solvent is no thing to watch if a man scares easy.

The business goes on right in front of your eyes, but at first all you see is the transmission gear, coated with thick goo, being lowered on a metal hook into an apparently empty tank. About a foot from the bottom of the tank, the grease starts running off the gear. Suddenly, the grease has all run off. Then a clear liquid starts trickling from the lower edge of the gear in a steady stream. Almost

After: Transmission gears are shown below cleansed by degreasing with volatile-solvent vapor.

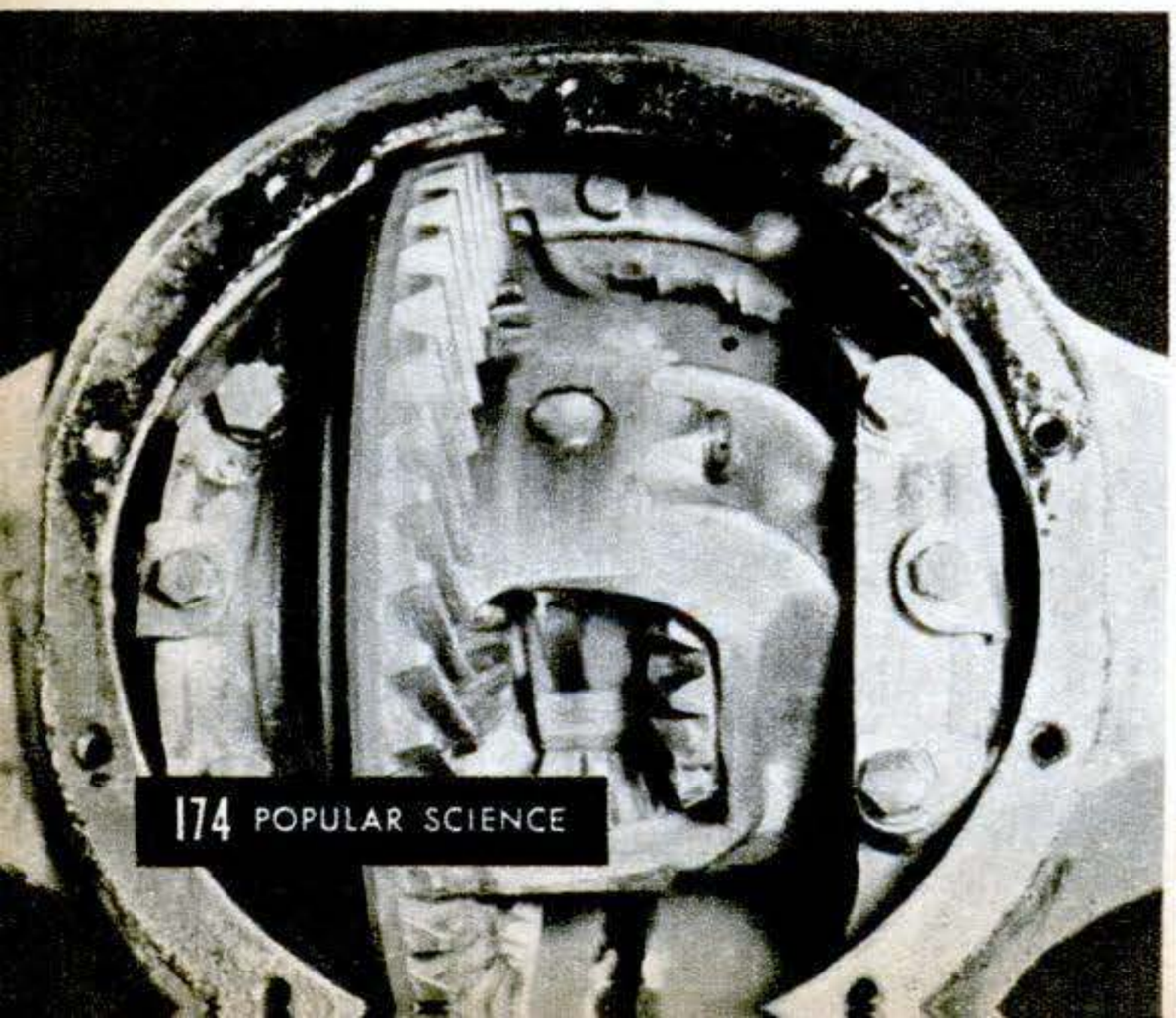


Portable degreasing gun goes into the filler hole of automobile differential. Plug-in electric heater vaporizes solvent in can. Pressure forces vapor through nozzle into gear housing.



Differential before cleaning, seen with plate removed, is gooey with dirty grease and oil.

Differential after cleaning is shown below. Condensed vapor has washed grease out drain hole.



as suddenly, after a few seconds, the clear trickle of liquid stops. The transmission gear that was a gooey blob eight or ten seconds ago is now clean—*chemically* clean, cleaner than a white shirt just back from the laundry.

Where did that trickle of grease-washing solvent come from? Where did it go when it suddenly vanished? The whole creepy performance is the result of collaboration by the familiar partnership of science and engineering.

Science pulled apart a molecule consisting of hydrogen and carbon atoms and inserted three atoms of chlorine. The result was trichlorethylene—a clear, volatile liquid that is 1.46 times heavier than water and boils at 188° F, or 24° below the boiling point of water. Trichlorethylene has gasoline or ether beat all ways from the ace as a solvent of organic oil, grease, wax, and tar. Among the reasons are that it is classed as a nonflammable solvent and gives off a vapor more than four times heavier than air.

Degreasing Is Big Business

Now, any time science comes up with a new grease solvent, engineering is immediately full of interest. For the removal of grease and oil from metal parts that must be painted or electroplated runs into an industrial cleaning bill of millions of dollars a year. And when the new solvent is nonflammable and loaded with other qualities of an ideal industrial solvent, engineering grabs it and puts it to work by designing degreasing apparatus for its specific use.

In its simplest form, the degreasing apparatus for employing trichlorethylene—Du Pont calls it Triclene D®—is a stainless-steel tank 17 inches square and 36 inches high. That is the Cub® model, manufactured by Circo Products Co., of Cleveland, and designed for small machine shops and automobile service departments.

The tank has a double bottom, the lower compartment housing electric heaters for vaporizing the solvent. The work compartment of the tank needs only four gallons of solvent to provide enough degreasing vapor to clean 290 pounds of steel parts an hour. A thermostatic control maintains the vapor level inside the tank at 17 inches.

To clean a batch of parts, they are lowered into the tank in a basket or on a hook. When the parts enter the vapor zone just above the level of the boiling solvent, the vapor immediately starts condensing on their cold metal surfaces.

Copyrighted material

This is the same thing that happens when steam strikes a cold window pane and condenses to drops of water. The concentration of trichlorethylene vapor, however, is much higher than that of water vapor at the same temperature. Because it takes only about one-ninth as much heat to vaporize a pound of trichlorethylene as is needed to vaporize a pound of water, a small change in temperature caused by contact with the cold, greasy parts produces a relatively large volume of condensate.

The condensed vapors are highly solvent and quickly strip all grease, tar, oil, or waxy substances from the metal. The contaminated solvent drips back to the bottom of the tank.

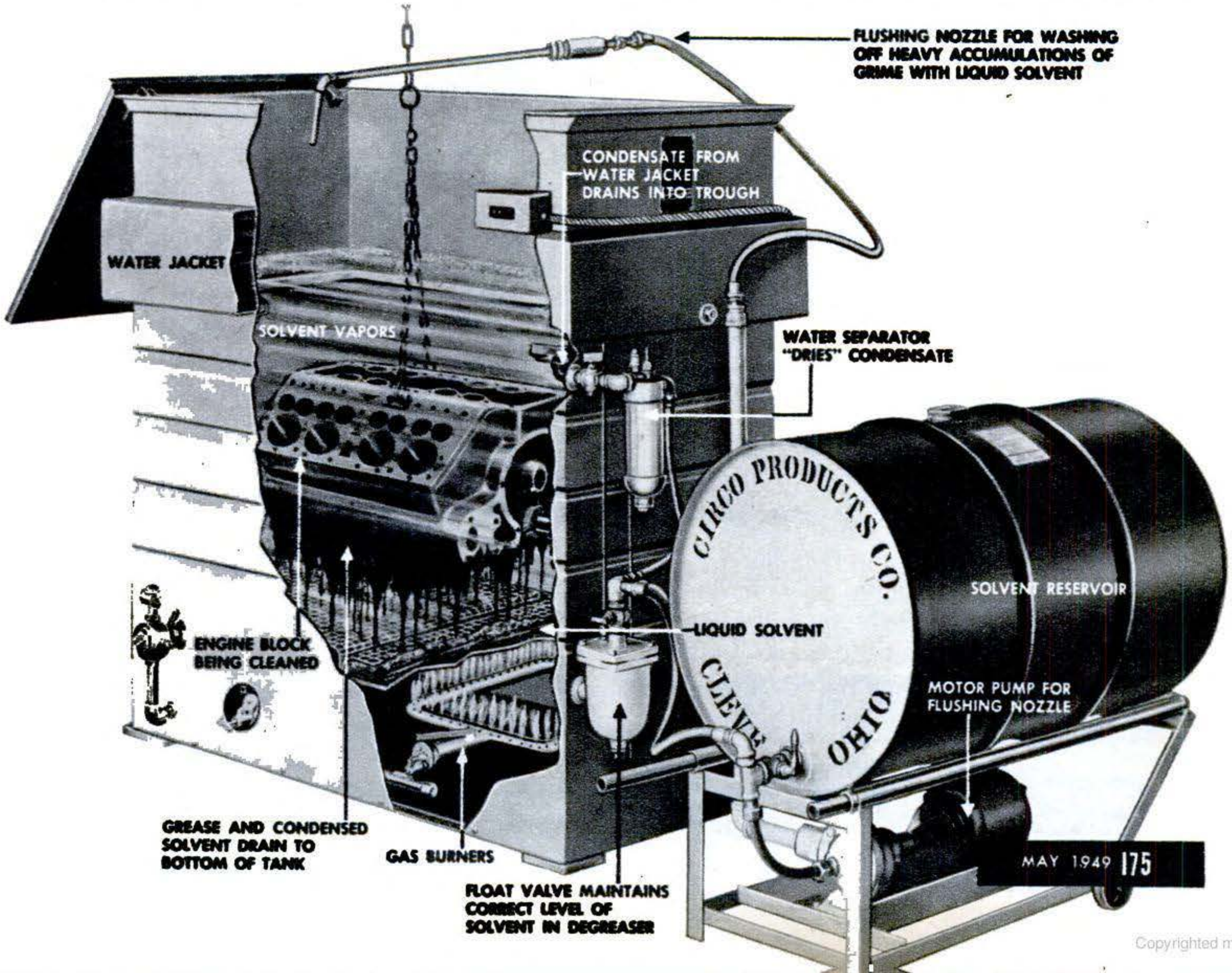
There it is reconverted into clean vapor by the heaters. Since the sludge and grease stripped off the work have a much higher boiling point than trichlorethylene, they do not distill into vapor again with the solvent. So, as long as there is a reasonable amount of solvent in the bottom of the tank, the cycle of vaporization and degreasing with pure solvent vapors can go on. It stops only when the work has been warmed to the temperature of the vapors. Condensation then ceases, and the work—washed clean—is lifted out of the tank.

If the work is inspected immediately after removal from the tank, any cracks or surface defects in the metal are readily detected by a fine line of wet solvent seeping out of the cracks.

The fact that trichlorethylene is soluble in water only to the extent of one part in a thousand is an indication of its chemical stability. Hence, all of the common metals—iron, steel, copper, zinc, aluminum—may be degreased by its vapor without etching their machined surfaces.

Trichlorethylene carries an Underwriters classification as a nonflammable solvent. It has no open-cup flash point. Its vapor, however, begins to break down chemically when in contact with hot surfaces of temperatures above 750°F. Thus, while the solvent is considered safe to use under normal shop conditions, the degreasing process should not be carried on near heat-treating furnaces or where welding is done. Very hot surfaces or an open flame will cause some of the

In medium-size model of vapor degreaser, shown below, the solvent is heated by gas burners. A water jacket around upper compartment of the tank speeds condensation of cleansing vapors.



Copyrighted material

chlorine to be released from the vapor. The vapor is nonexplosive.

Because the solvent vapor is 4½ times heavier than air, it mostly remains down inside the degreasing tank. If strong drafts across the top of the tank are prevented and the work is lifted out slowly enough to prevent pumping the vapor out of the tank, only a slight aromatic odor in the vicinity of the degreasing apparatus is noticeable.

Since trichlorethylene is a powerful solvent of all types of organic grease and oil, repeated contact of the fluid or hot vapor on the hands will extract the oil from the skin and cause dryness and cracking.

Its toxicity is rated as low compared with that of most volatile solvents. But the vapors of all solvents, except water, are considered toxic to some extent if the concentration is great enough and the time of repeated exposure is long enough.

Safer to Use Than Naphtha

Trichlorethylene, if inhaled in considerable concentration, can cause dizziness and a feeling of fatigue. Ordinarily, a few deep breaths of air bring complete recovery. In extreme cases of exposure, the victim may need a complete rest and a doctor's care. There is no medical record of any accumulative bad effect on the human system from the vapor of trichlorethylene. It is far safer to use than either naphtha or some of the other chlorohydrocarbon solvents.

Where large quantities of parts are to be degreased by the vapor method, the apparatus is more complicated and costly than for the dip method used in small machine shops and automobile service departments. These high-production machines are equipped with automatic conveyers. The work is hung on hooks or placed in baskets and carried through the degreaser on a continuous conveyer chain.

During this process, the work is first submerged in liquid solvent or passes through a liquid spray. It then is carried over a draining rack—all enclosed—to the final vapor stripping chamber. The work comes out warm, but not uncomfortably hot to the bare hand, and is dry and chemically clean—ready for inspection, painting, or electroplating.

Portable Model Cleans Differential

Vapor degreasing has also been adapted to cleaning out old and contaminated grease from automobile transmissions, differentials, and overdrives before adding new, clean lubricant. The device used for this looks like a paint-spray gun and is manufactured under the name Dee Tee® by Circo Products.

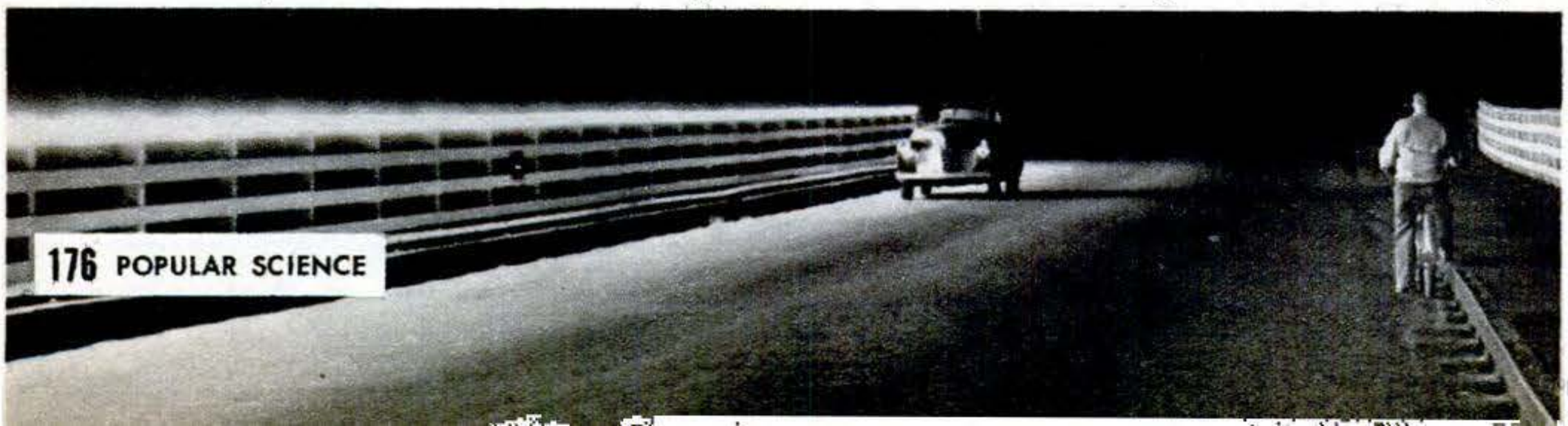
In using this small vapor degreasing device, the drain plug of the housing is removed and as much of the old oil is allowed to drain out as will flow while the service attendant is lubricating the other points of the chassis. When the attendant is ready to clean out the residual grease from the housing, he screws a small can of Circo Dee Tee Solvent® to the electrically heated part of his small portable vapor degreaser.

After a few moments, the solvent is sufficiently heated to generate a flow of vapor through the nozzle. This is inserted in the filler hole and sealed vapor-tight by an adapter. In less than ten minutes the solvent vapor will thoroughly strip all old oil or grease from the housing, washing out at the same time any small metal particles that have accumulated. When the contents of the small can of solvent have been completely vaporized, the interior of the housing is clean and dry—ready for refilling.

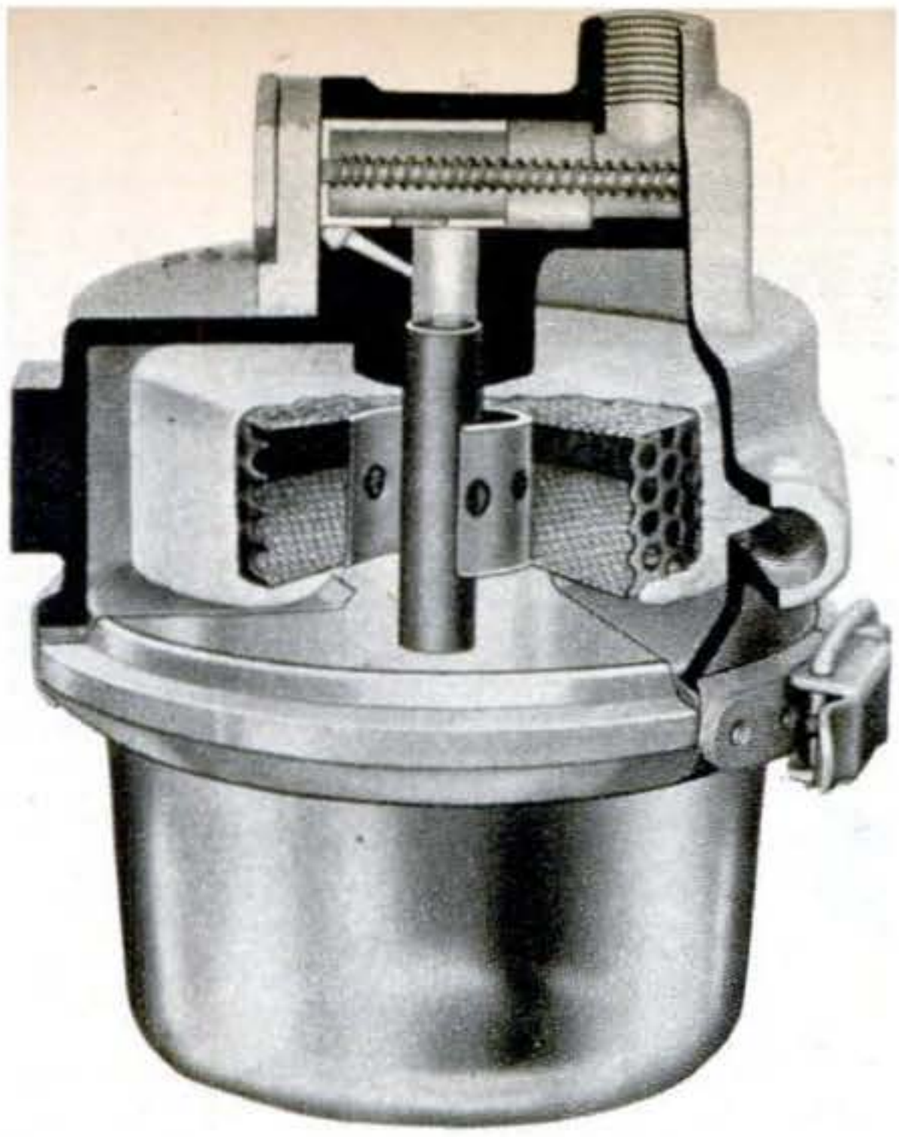
The manufacturer does not recommend this portable vapor degreaser for flushing out the engine crank case, probably because the vapor would condense before reaching the extreme ends of a cold crankcase. END

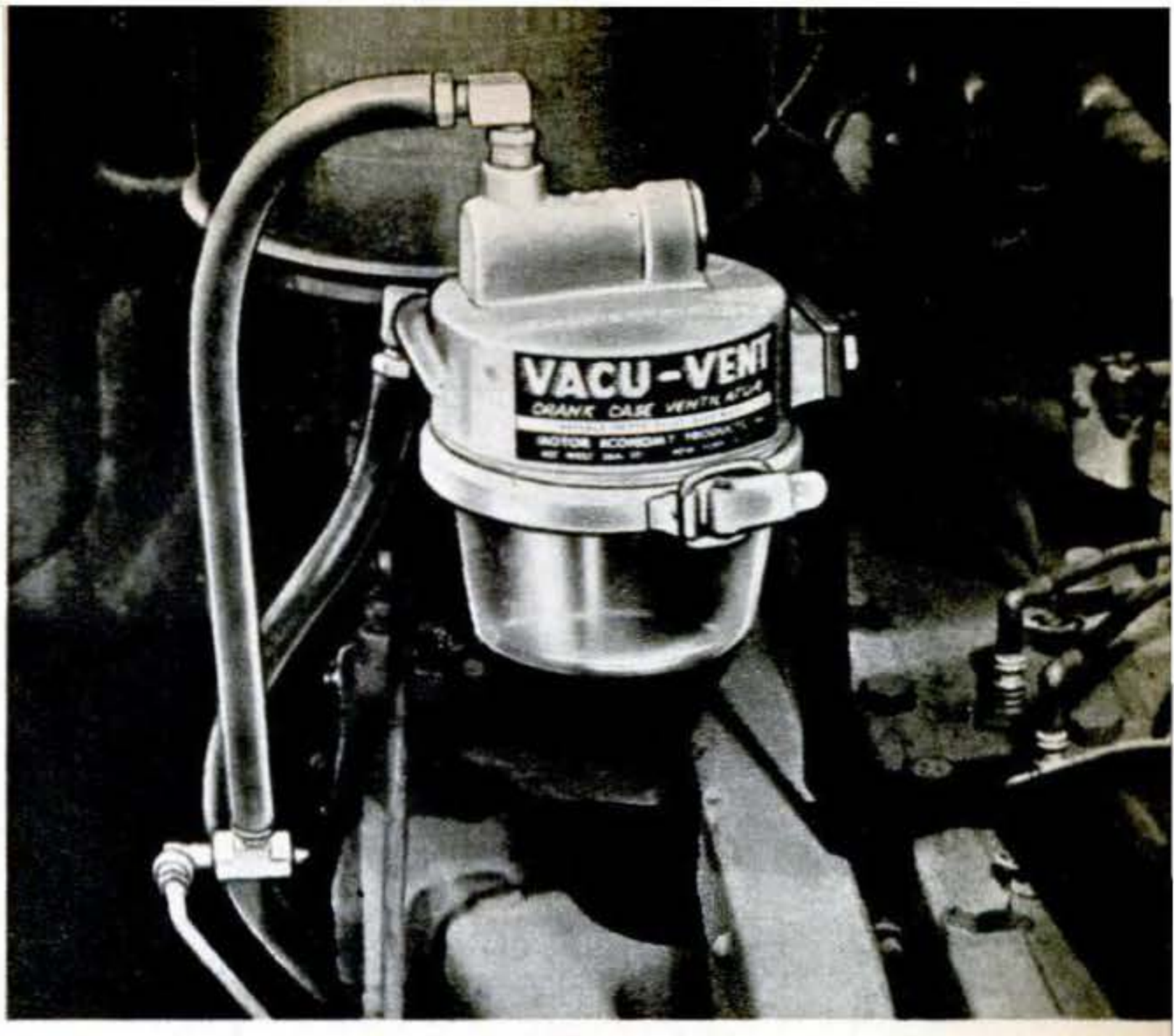
Fluorescent Strip on Bridge Rail Lights Road

A CONTINUOUS row of 8-foot fluorescent lamps along one railing of this bridge at Salem, Mass., throws light over the entire 32-foot roadway and the sidewalk at right. The experimental installation, by Sylvania Electric Products, lights a 500-foot section of the bridge so well that motorists can drive over it at night without headlights.



Copyrighted material



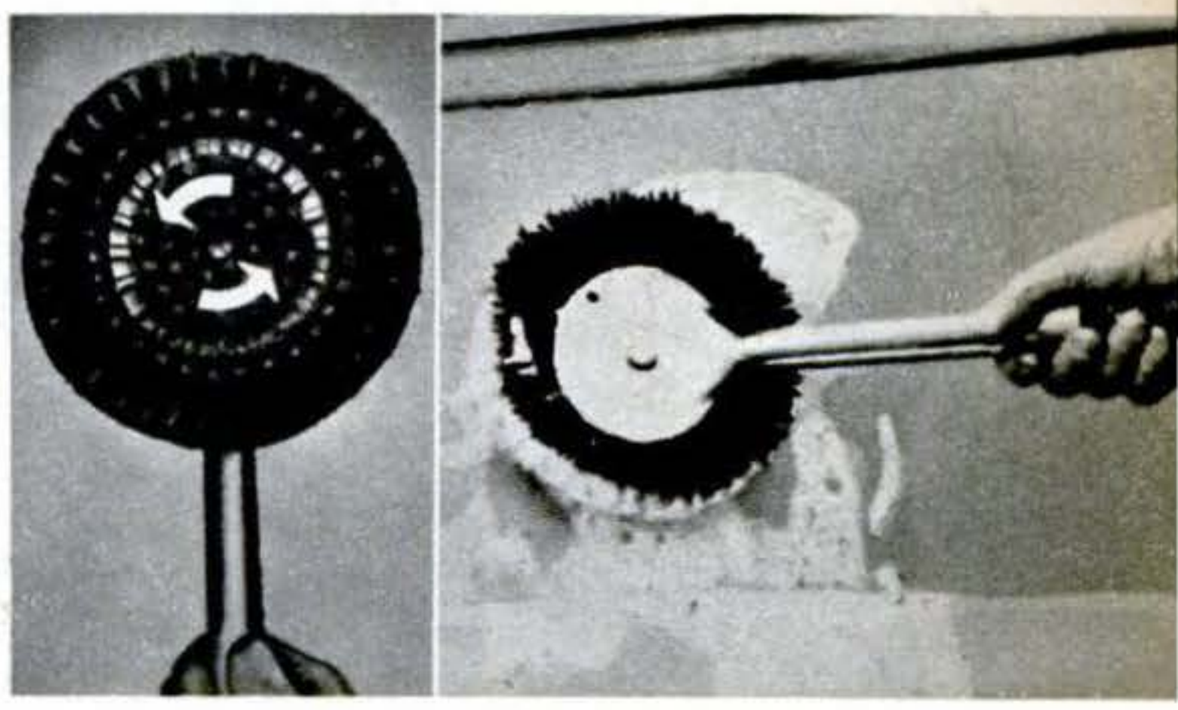


Crankcase Ventilator Filters Vapor Impurities

THE Vacu-Vent®, recently introduced by Motor Economy Products, New York, is said to reduce engine wear by filtering gaseous impurities in the crankcase and introducing the cleansed vapors into the intake manifold. Vacuum in the manifold actuates an air-valve piston in the device, creating a corresponding vacuum that draws out the crankcase vapors. Savings in gas and oil consumption are claimed for the ventilator, as well as increased engine power. It sells for about $17 and can be installed in under an hour.

Water Makes Car Brush Revolve

A REVOLVING brush driven by either high or low pressure through a garden hose takes some of the work out of car washing. A stationary bumper brush reduces splashing and enables you to clean corners. The Swirl-O-Matic®, sold by Melaire Distributing Co., New York, is priced at about $7. Replacements for both brushes are also sold. The scrubber can be used for cleaning screens, walls, and other large surfaces.



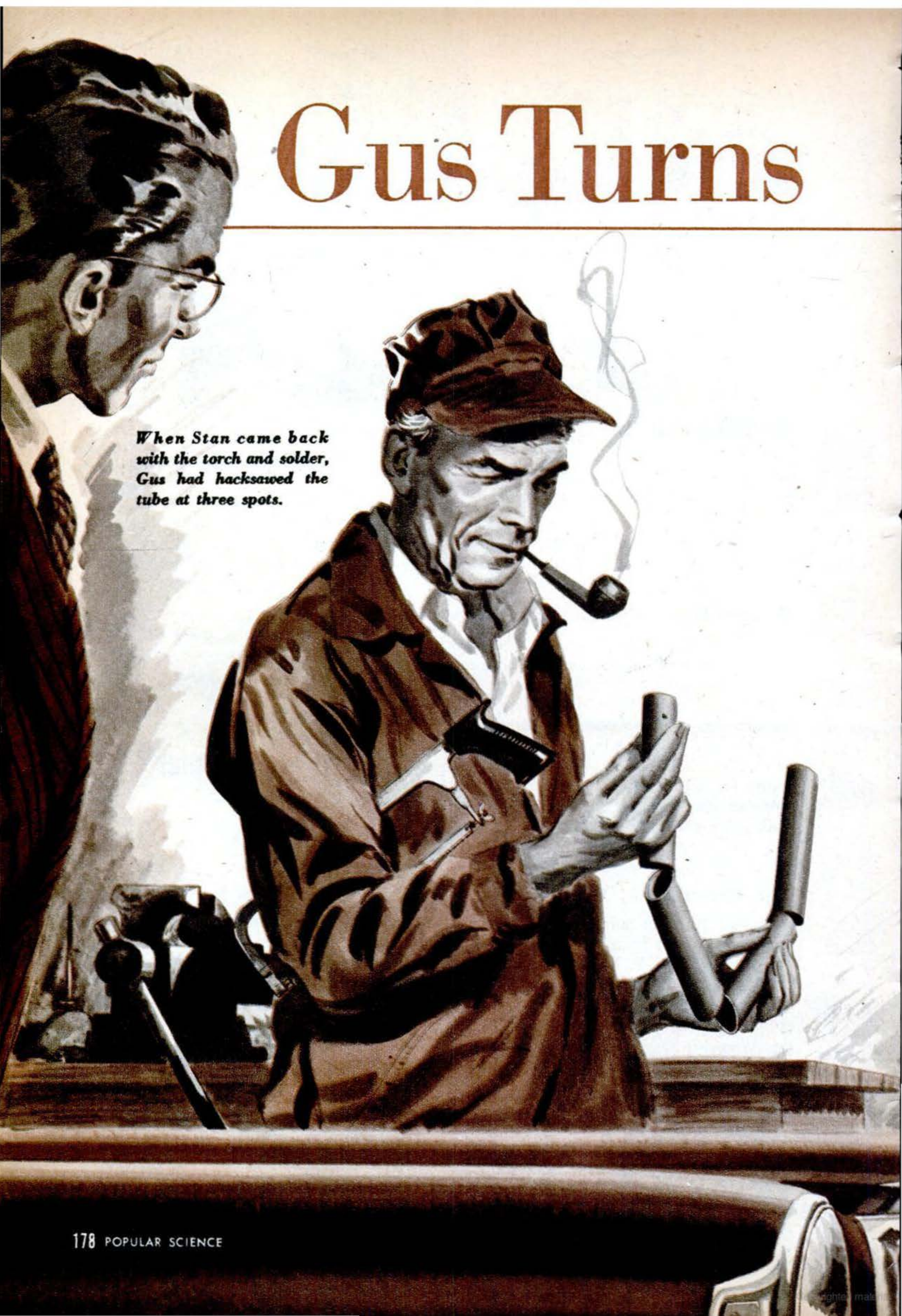
Pet Rider Gets Window Seat

LATEST thing in animal riding comfort is this portable, padded, railed window seat invented by W. W. Casteel of San Diego, Calif. It is a 20" diameter semicircle that hooks into the window well to give pets more air and a better view of the scenery.

Mirror Locked by Door

A REAR-VIEW mirror being distributed by Ford dealers hooks onto the door top so that it can't be stolen when the doors are locked. Only one screw clamp is needed for the installation. Angle of vision is adjustable from inside the car.

Gus Turns



When Stan came back with the torch and solder, Gus had hacksawed the tube at three spots.

the Heat Off

The heat was on in more ways than one. A used-car dealer started it when he told his young salesman to deliver or else, and an old sedan kept it going until Gus cooled things off.

By Martin Bunn

STAN HICKS bustled into the Model Garage office. Gus Wilson, puffing his pipe, was checking over a stack of accounts with his partner, Joe Clark.

"Boss," Stan broke in, "you know—"

"I'm busy," Gus said without looking up.

"But Boss," Stan persisted, "you know Lem Spardom?"

"No, and I'm still busy," Gus said shortly.

"Aw, have a heart," Stan begged. "Lem's in trouble. He's really up against it now."

"You'll be up against it yourself if you don't stop bothering me," Gus said sternly. He winked at Joe Clark.

"But Boss . . ." Stan pleaded.

"Okay, okay," Gus grinned, pushing a stack of papers aside. "What's the trouble?"

"It's like this," Stan began. "Lem was in my class in high school. Now he's a salesman for Snedicker—that used-car dealer down the highway. Lem did all right for a while but he ain't been doing so good lately. Snedicker told him he'd cut off his drawing account if he didn't sell a car this week."

"That's tough," Gus said.

"That ain't all," Stan went on. "This is Saturday afternoon and it's still no sale for Lem. And he's got a wife and kid to take care of, too."

"That's also very tough," Gus said, "but we're running a garage, not a personal-problem clinic for used-car salesmen."

"Aw, Boss . . ."

"Seriously, Stan, what can I do about it?" Gus asked, dropping his hardboiled pretense.

"It's this way," Stan sighed. "Lem's got a car he can sell this afternoon if one thing is repaired. The temperature gauge keeps climbing over into the red. This man told Lem he'd buy the car if it was fixed by four o'clock and you said it was fixed."

"It's after three now," Gus said.

"I know it," Stan said, "and selling this car is Lem's last chance to hang on to his meal ticket. Otherwise, this customer'll go to another dealer."

"All right," Gus agreed. "Where's this car with the climbing temperature gauge?"

"In the shop," Stan said, "and I don't know

Copyrighted material

why it should be climbing so high. The water in the system's not very hot."

"I'll be with you later, Joe," Gus told his partner.

Stan led the way to the shop, where Lem Spardom, a studious-looking young man, stood beside a 1941 sedan. He seemed worried. Gus shook hands with him and glanced at the instrument panel. The temperature gauge showed over 200 degrees. Gus stepped around and looked at the engine. He noted that the fan belt and radiator hoses were new.

"See you been having some work done," Gus said.

"Quite a bit," Lem answered. "When our mechanics went over this car they found someone had removed the thermostat. After they put in a new one, the gauge indicated overheating."

"They use the right one for this model?" Gus asked as Stan let the radiator drain.

"They tried two or three different ones, checked and rechecked them but couldn't get anywhere. Before they got through, they put on a new water pump, installed those hoses, reverse-flushed the radiator, and put in cooling-system solvent."

"And it still overheated?" Gus asked.

"The radiator never boils," Lem went on, "but every time you look at the gauge you think it's about to. One of the mechanics wanted to take the thermostat out and just not say anything about it. I couldn't see that. It looked like a dirty trick."

Gus Finds the Hot Spot

"It would have been a dirty trick," Gus agreed. "Yanking the thermostat looks like an easy cure for overheating. Actually, it just covers up the cause of it for a while."

"Well," Lem said, "I don't know about thermostats, but I figured that if the manufacturer put one in, it ought to stay there."

"That's right," Gus said. "Pull one out and you pay for it sooner or later in increased engine wear and higher gas and oil bills. A thermostat temporarily blocks water circulation to let the engine build up to normal running temperature fast. Gasoline vaporizes and oil circulates much better in a warm engine. After she's warmed up, the thermostat lets the water circulate."

"Maybe the temperature gauge is out of whack," Stan suggested.

"Could be," Gus agreed.

"Or the heat-indicator unit on the engine," Stan added.

"Could be that, too," Gus said. "We'll check those two points first. Get me a pan of water, Stan."

Gus removed the heat indicator unit and examined it closely. Then he put the pan of water on a gas ring. When it boiled, he dropped the unit—still connected to the gauge—into it. The gauge promptly registered boiling.

"Right on the nose," Gus commented. "The unit and gauge seem to be okay."

"Now we're right back where we started from," Lem shrugged.

"Oh, it's not that bad," Gus said. "I think I know what the trouble is—maybe. Get busy and take off the water pump, Stan."

Gus stepped to his workbench, selected a welding rod, and shaped one end into a small hook. Stan removed the pump, revealing a hole into the block where the pump had been. Gus poked the hooked end of the rod into the hole and yanked. Nothing happened. He pulled again, but still nothing happened.

"I get it," Stan said suddenly. "I ought to have thought of it before. Wait a minute." Stan hopped to the bench and came back with a hammer, a small chisel, and a hacksaw.

Gus grinned. He took the chisel and hammer and spent a minute tapping gently around the circumference of the hole. Then he again pushed the hooked rod into the hole. This time he slowly withdrew a few inches of badly rusted oval tubing.

"What's that?" Lem asked.

"The water-distributing tube," Gus said. "It runs lengthwise through the block inside the cooling jacket. It carries the incoming cooler water from the radiator directly to the valves and valve seats. Keeps them from burning and lengthens their life."

"I didn't even know there was such a thing," Lem said.

"Most car owners don't either," Gus told him, "and some mechanics have a bad habit of forgetting. Every L-head engine built since 1935 that has a water pump in front—except V-8's—has one. Before water goes to any other part of the engine, that tube carries it right to the valves."

Gus pulled out a few more inches of the tube and cut the bottom almost through with the hacksaw. Then he bent the section upwards. He continued to pull out the tube, cutting and bending as he went along, until he had removed its entire length. Much of the tube's bottom and sides had been eaten away by rust.

"There's the cause of your trouble," Gus said. He held the tube up. "This should have

Copyrighted material

been replaced a couple of years ago, anyway."

"I don't get it," Lem said. He stared at the corroded tube Gus held. "You mean that rusted tube makes the temperature gauge run up high?"

"That's right," Gus said. "It's so rusted that it couldn't carry water where it should. So you had a localized hot spot where the heat-indicator unit is located on the engine. A new tube will fix it."

The Heat's Off

"Well, that's fine," Lem said, still a little doubtfully, "but I've got to deliver this car in a little over half an hour or I can drive it right back to Snedicker."

"Gee, Lem," Stan said, "can't you get this guy to wait? We'll have to pull the radiator to get the new tube in. That'll take too long."

"If that's the case, I'm sunk," Lem said. "This man said to bring the car and no overheating by four o'clock, and he meant it."

"That's too bad," Stan sympathized, "but we'll have to pull the radiator. The new tube's too long to get between it and the block. Then we got to put it back."

"Maybe we can beat the deadline," Gus grinned. "Get a new tube from the stockroom, Stan, and make it fast."

Stan made it fast, but when he returned with the tube he found Gus methodically filling his pipe while Lem hopped around impatiently. Stan wondered why Gus wasn't working on the grille.

"Want me to take off the grille?" Stan asked.

"Never mind the grille," Gus answered. "It can stay right there. We're going to shortcut this job. Let's have that tube. And get me a torch and some solder."

Gus is one of those expert mechanics who talk slowly, never seem to be in a hurry, but work fast. By the time Stan came back with the torch and solder, Gus had hacksawed the new tube three-quarters of the way through at three points. He bent the sections around and pushed the first one into the hole in the block almost as far as the cut. Then he bent down the next section and soldered the cut. He pushed that section in and soldered the next cut. Working that way he had the new tube installed in less than 10 minutes.

"There you are," Gus said, straightening up from his work. "Almost set to go and we didn't have to touch the grille."

"That's swell," Lem grinned, keeping an eye on the clock.

"Put the water pump back on and fill up the radiator," Gus told Stan.

Stan jumped to his work. "If you didn't do that cutting and soldering, what a job that could be on some models—those that have the grille and fenders as one unit."

"I don't know how to thank you," Lem said. He stuck out his hand. "You sure saved my skin."

"Forget it," Gus answered.

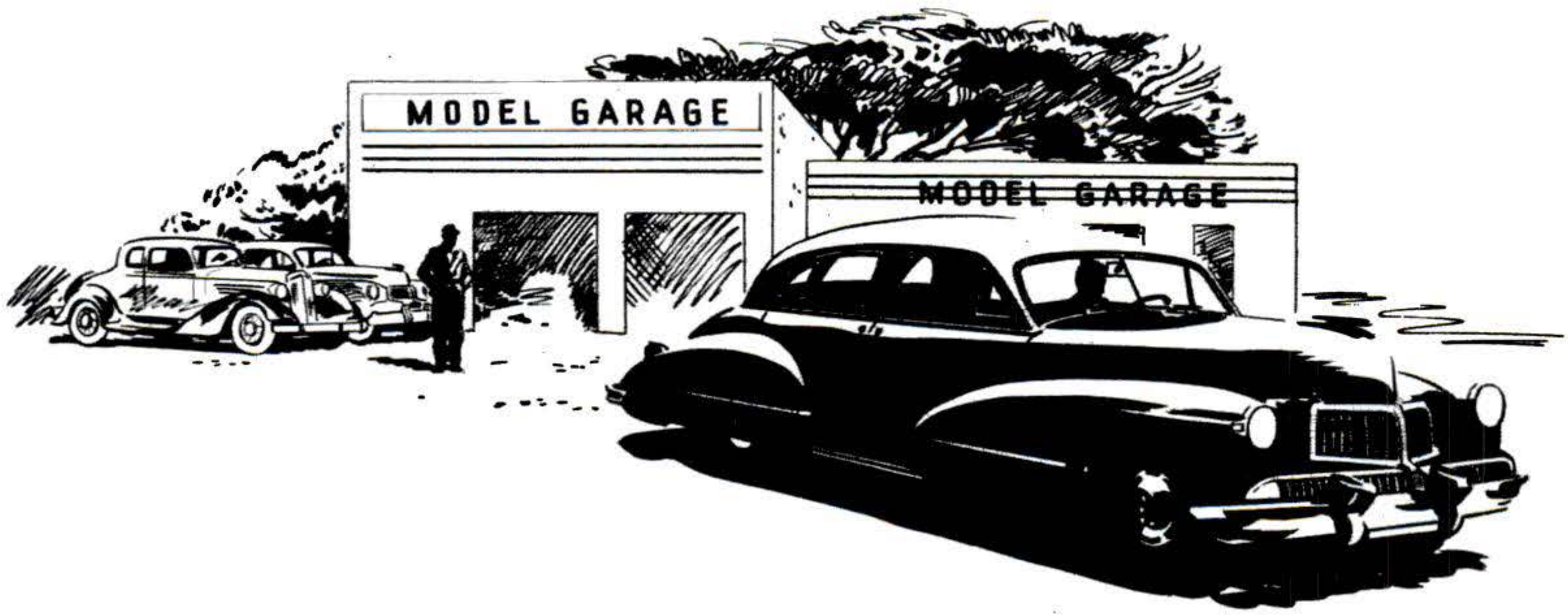
"I'll drive by later and take care of the bill," Lem said, climbing into the car.

"You can tell your customer that the overheating is cured."

Stan filled the radiator and Lem drove out. "Gee, Boss," Stan told him, "you sure deliver when the heat's on."

"Hey, Gus!" came a sharp yell from the office. "Will you for gosh-sakes come back and finish these accounts with me?"

Gus grinned at Stan. "The heat's still on. What I better do is deliver now, before Joe starts steaming." END



Copyrighted material

Drawings by The Motor Cycle (England)

A radiator placed crosswise between the leg shields cools flat-twin engine of new Velocette.

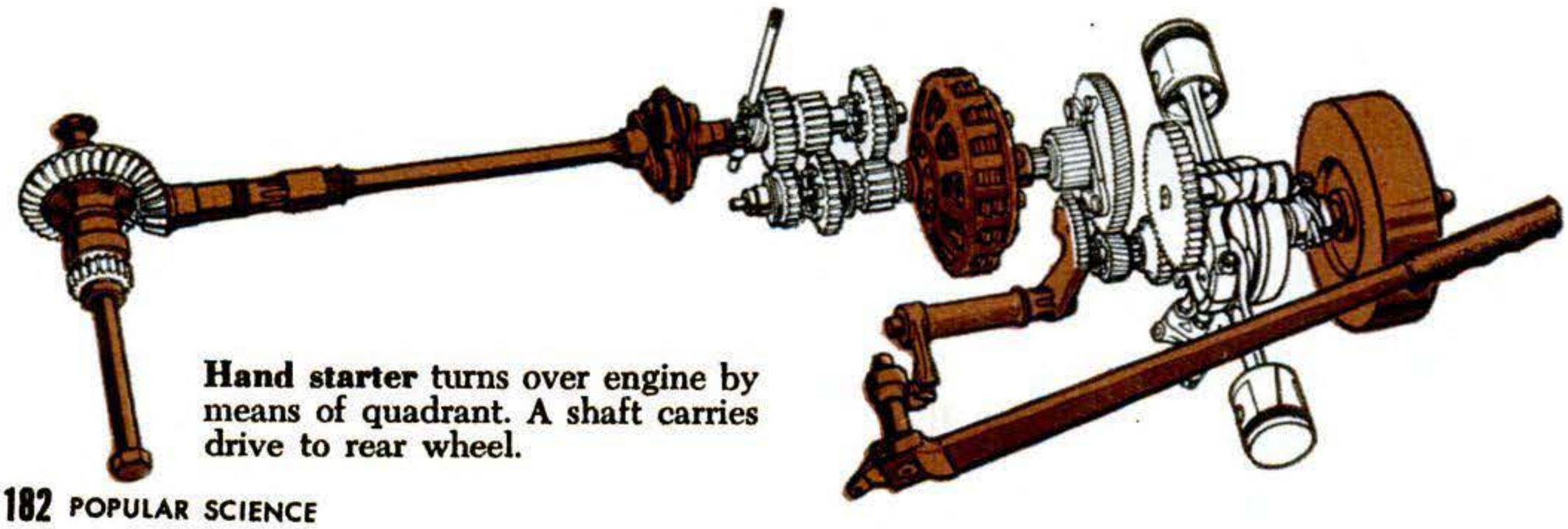
Water-Cooled Motorcycle Starts by Hand

WATER cooling, a hand starter, and a shaft drive are among the features you'll find in the new lightweight Velocette 149, a British motorcycle of striking appearance that's soon to reach the U. S. market. It's powered by a transverse, horizontally opposed twin engine with side valves.

Although piston displacement is only 149 cc. (9.08 cu. in.), the engine is reported to have plenty of umph. It has a comfortable top speed of about 50 m.p.h. and runs with a sewing-machine hum. In this country, the 264-lb. machine will sell for about $432.

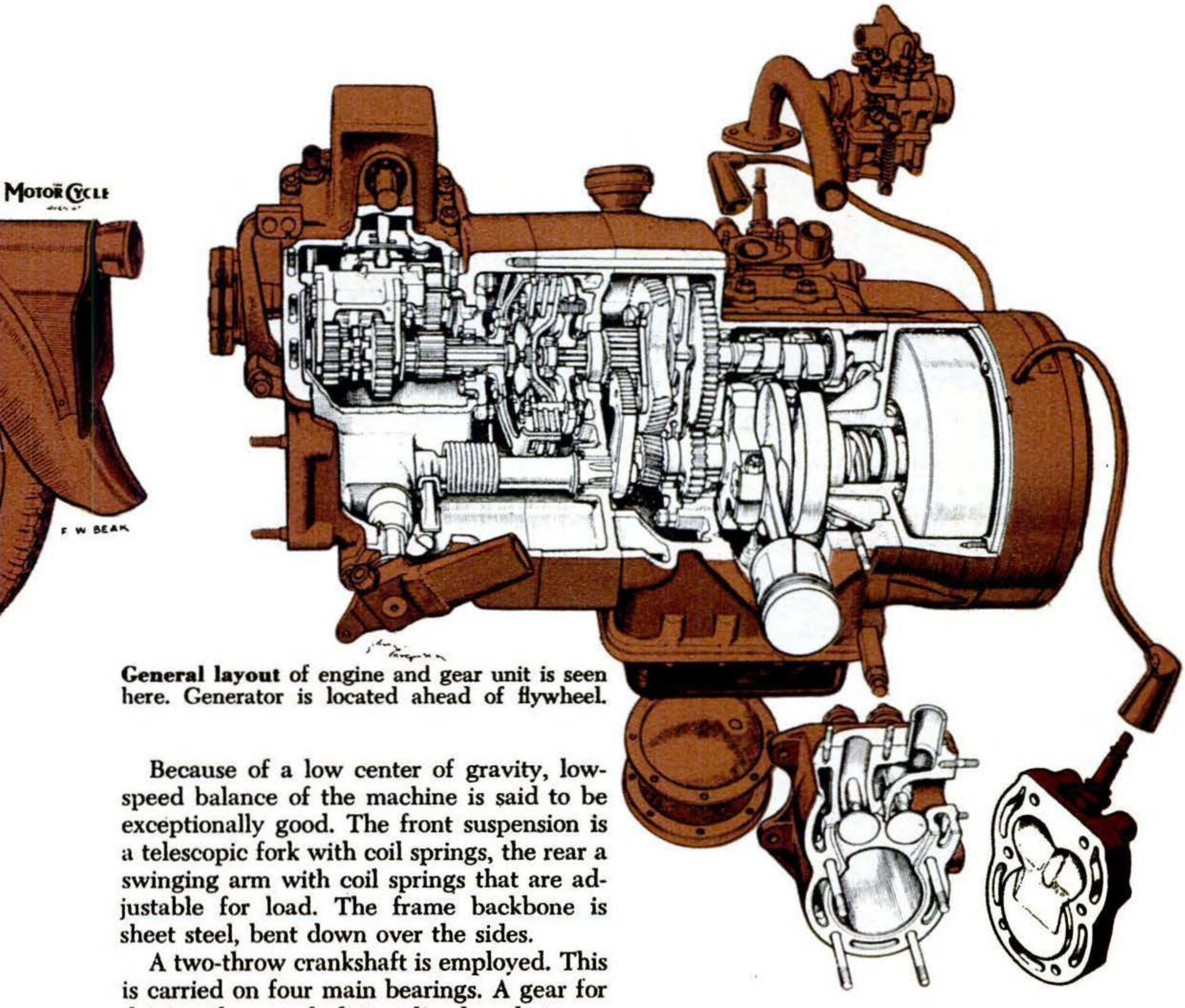
When pulled, the starter handle partly rotates a fore-and-aft shaft. Splined to this shaft is a quadrant that engages a small starter pinion. By means of two pawls, the small pinion rotates a large primary reduction gear, which in turn rotates the engine. The starter handle also raises a prop stand fitted under the footrest on each side.

Gears are shifted with a hand lever set in a gate above the starter lever. The gear box provides three speeds. A handle-bar lever controls the clutch.



Hand starter turns over engine by means of quadrant. A shaft carries drive to rear wheel.

Copyrighted material



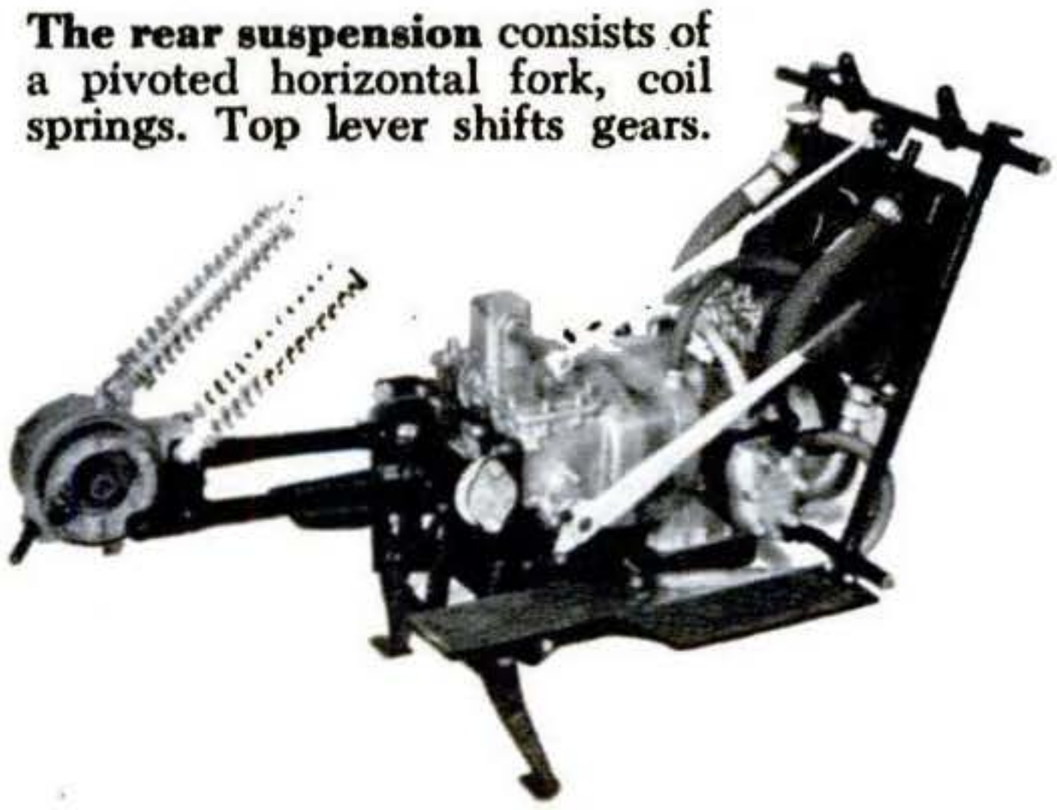
General layout of engine and gear unit is seen here. Generator is located ahead of flywheel.

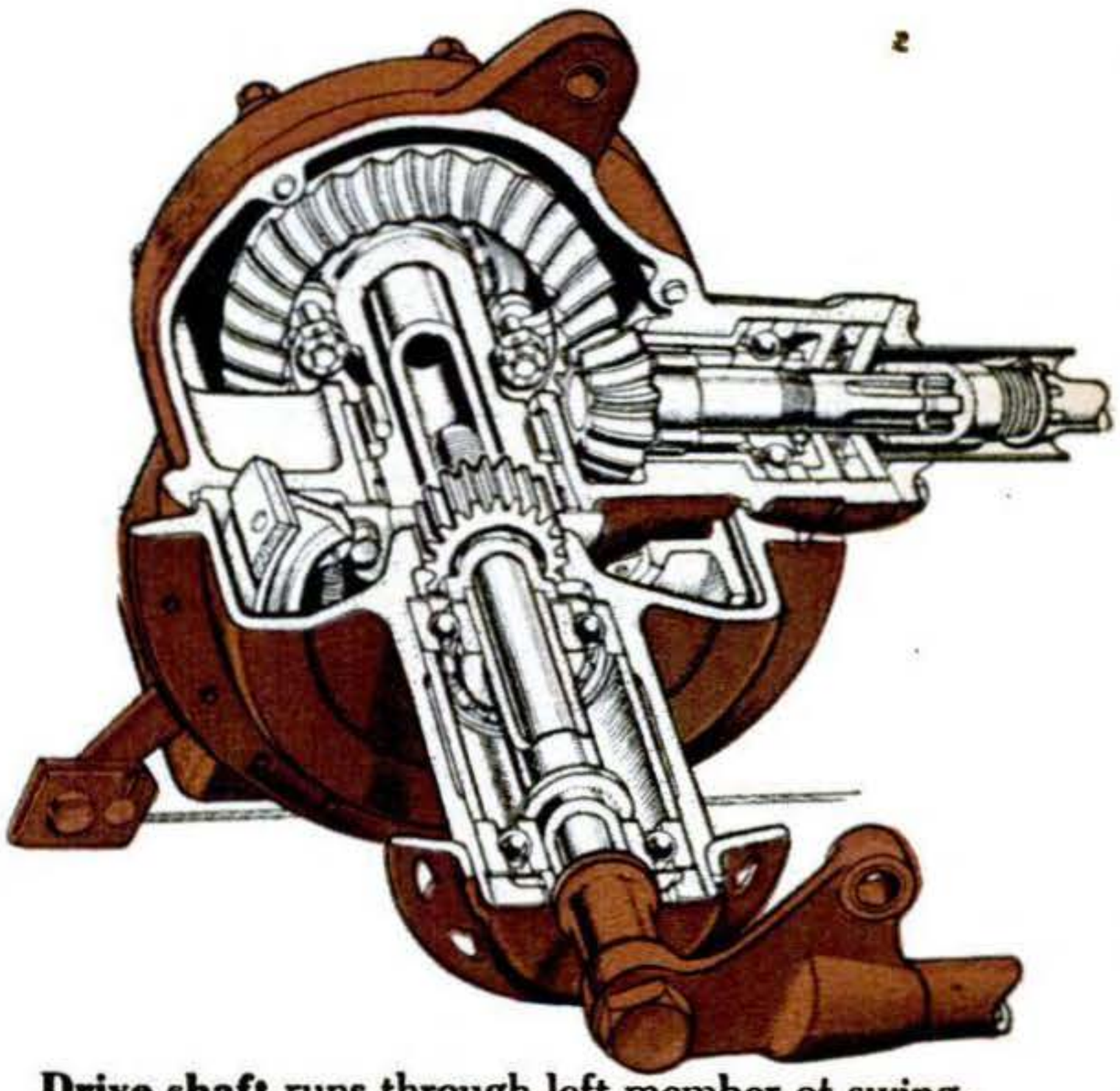
Because of a low center of gravity, low-speed balance of the machine is said to be exceptionally good. The front suspension is a telescopic fork with coil springs, the rear a swinging arm with coil springs that are adjustable for load. The frame backbone is sheet steel, bent down over the sides.

A two-throw crankshaft is employed. This is carried on four main bearings. A gear for driving the camshaft is splined on between the two rear main bearings. Running on two ball bearings, the camshaft is immediately above the crankshaft.

Splined to the tail end of the crankshaft is the primary drive pinion. This engages the large primary reduction gear. Mounted on the end of the primary reduction-gear shaft is a two-plate dry clutch, followed by the transmission. An air cleaner is fitted behind the top of the radiator (see below).

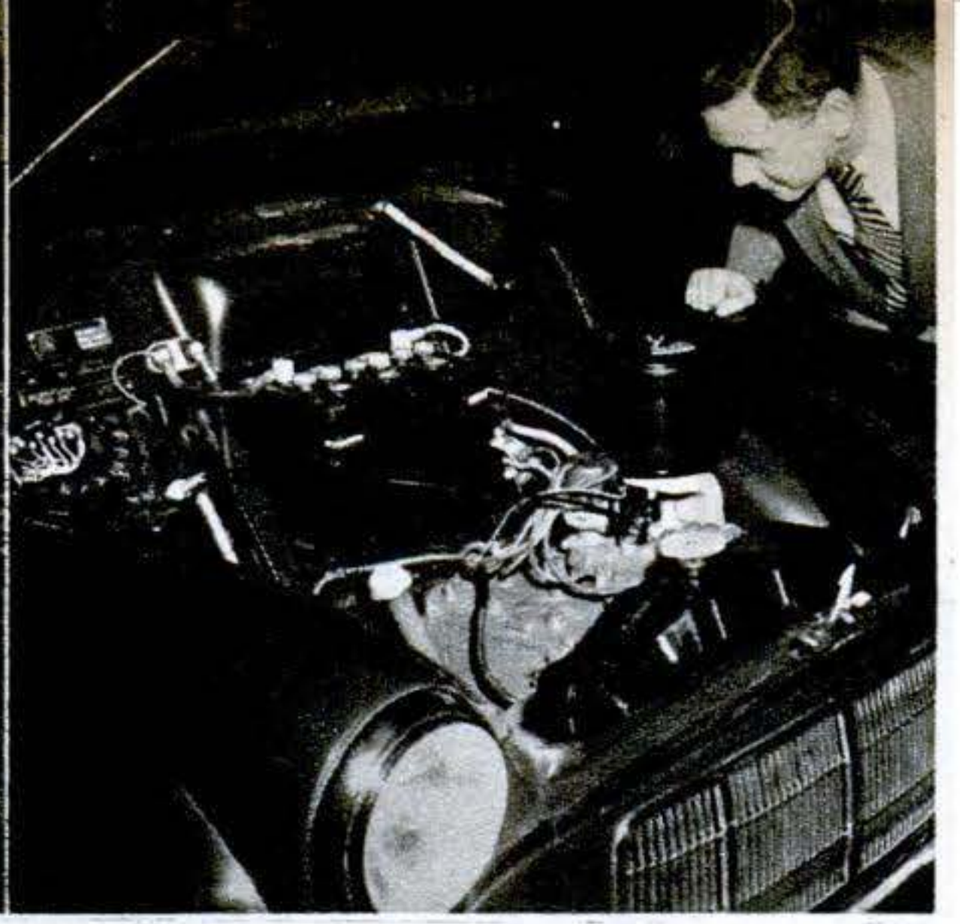
The rear suspension consists of a pivoted horizontal fork, coil springs. Top lever shifts gears.





Drive shaft runs through left member of swinging rear fork. Note brake opposite the gears.

Copyrighted material



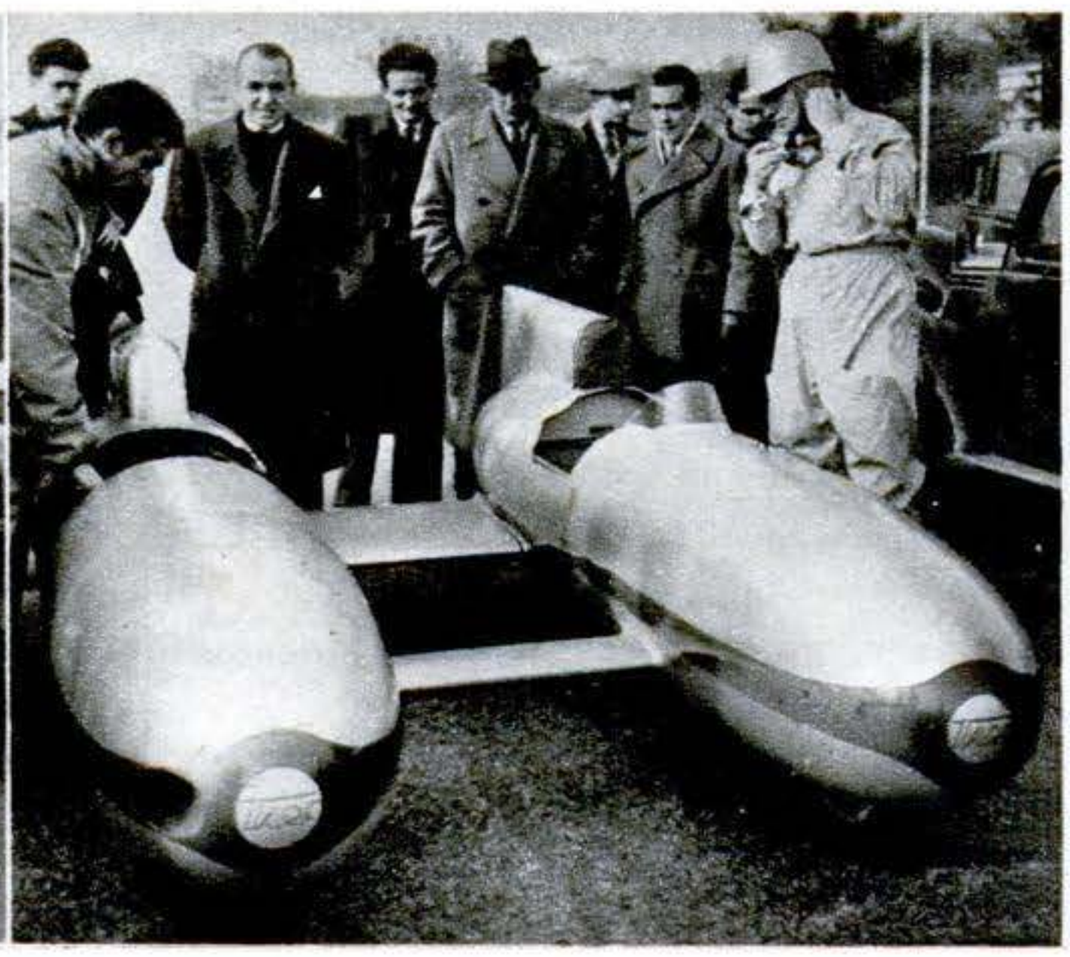
Low-Cost Convertible Offers Big-Car Styling

SHOWN above is the convertible model of the Morris Minor, a small British car now being imported into the United States. The convertible sells here for about $1,600.

It's powered by a compact four-cylinder British Bulldog engine that delivers 27 hp. The engine sets well forward, allowing all passengers to ride within the wheelbase.

Like its hard-top counterpart, the convertible has a wheelbase of 86". The overall length is 147½", width 60", and height 58". The convertible top is raised and lowered by hand. Rear side windows are removable when the top is down. The pull-type door handles are flush fitting.

In keeping with British custom, the car has four forward speeds. Gears are shifted with a floor lever. Top speed is about 60 m.p.h. The car is said to give 35 miles per gallon, even in stop-and-go traffic.



Double-Barrelled Car Sets New Speed Records

FIVE world speed records for cars with 500 cc. (30.5 cu. in.) engines have been established in Italy by this twin-fuselage racer, designed and driven by Piero Taruffi. Highest speed was 128.8 m.p.h.

Streamlined to cut down air resistance, the car has vertical fins to increase stability. The driver sits in one fuselage, and the other carries the engine and fuel tank. The engine is a V-twin, air-cooled, unsupercharged Guzzi that develops 45 hp.

Chains from a four-speed gear box drive the rear axle, housed in a streamlined cover between the fuselages. Gears are shifted hydraulically by means of a lever between the driver's knees. Engine controls also are hydraulically operated.

Instead of a wheel, the car has two levers for steering. These move back and forth like steering controls in a tank. One turns the car to the left, the other to the right. All wheels are independently sprung. Brakes are operative only on the rear ones. The entire machine weighs only 551 lb.

Taruffi hopes to build a larger car of the same type to race at Indianapolis.

Copyrighted material

1. Jack up the car. That's the first step when tires or tubes are fixed at the General Tire shop in New York without removing wheel from car. The jack lifts two wheels off the ground.

How an Expert Fixes a Flat

In this shop, they do the job without taking the wheel off the car—and can do it in less than four minutes.

By R. P. Stevenson

PS photos by W. W. Morris

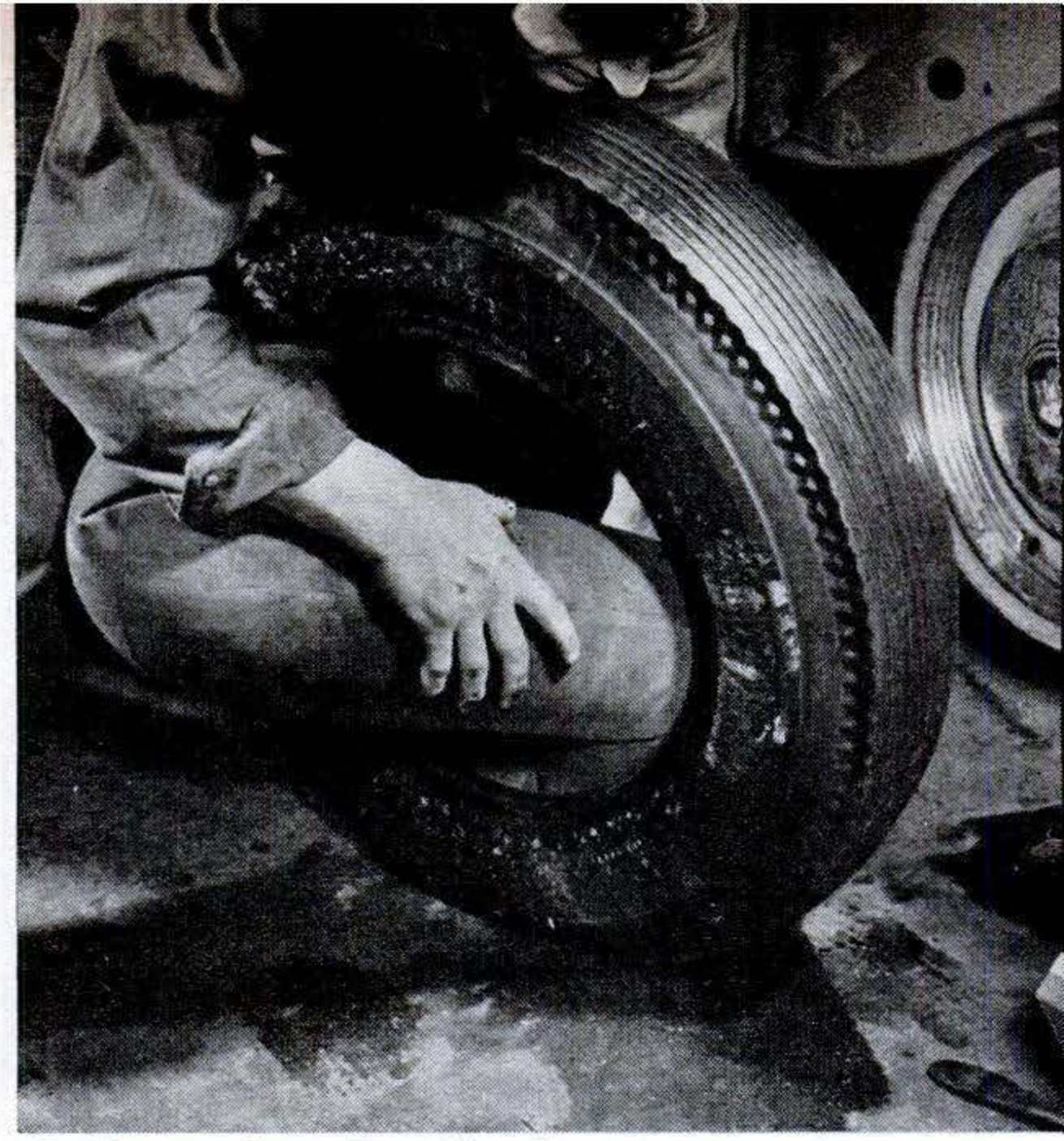
ONE day this spring a motorist drove into a tire shop on New York City's West Side. His car was secondhand, a recent purchase. Its rubber seemed good but he wasn't sure about the tubes.

Two tire men went to work when he ex-

2. Break outer bead. After letting out the air and sloshing liquid soap around rim and bead, mechanic frees outer bead with tire iron and hammer. Hammer never hits side wall, however.

3. Now free the tube. With the outer bead off the rim, he stretches tire toward himself to pull valve stem from the rim. He also checks to make sure tube isn't sticking to the rim.

4. Loosen the back bead. Several hearty tugs loosen the inside bead and it's then an easy matter to pull tire from the rim. Entire job up to this point took 1 min. and 40 sec.



5. Put in the tube. After being given a shot or two of air, a tube is shoved into casing. Mechanic's weight spreads tire enough so he can put in ordinary tube without difficulty.

plained that he'd like to check the tubes. One slid a hydraulic jack under the frame at the middle of the car and tilted it, raising a front and rear wheel off the ground. The other got together a few tire irons, a couple of hammers, and two battered old cans—one containing liquid vegetable soap and another filled with a greaselike substance.

Then both turned to the wheels, one at the front, one at the rear. Not bothering to pry off the hub caps or unscrew the lugs, they let the air from the tires, made a few passes with a tire iron, and dragged off the casings—leaving the wheels on the car.

With the casings and tubes inspected and a new tube installed, the tires were mounted again in a jiffy. After a repeat performance on the opposite side of the car, plus similar attention to the spare, the job was done.

Just a little more than ten minutes after entering the shop, the motorist drove away.

Such speedy service is a common occurrence at the shop of the New York General Tire Company. The secret lies in the fact that the job is done without removing the wheels from the car.

The procedure was adopted during the war, when both time and help were short. It proved such a time-saver that the company made it standard practice. Today, mechanics at the shop take pride in the speed with which they do the job.

At the outset, other tire men threw up their hands, said it was a bad idea. How could you, they asked, remount the tire without pinching the tube?

But General does it. In the years the shop has been mounting tires in this way there have been only a couple of returns for failure because of pinched tubes.

You can see how it's done in the accompanying series of photos. If you're an old grunt-and-strain tire hand yourself, it may be a surprise to learn that the job is done with such little effort and so few tools.

There's no reason you can't do the same thing yourself. Here's one caution. Be sure you have a good jack, one that will let you exert pressure without knocking the car down on your toes.

The General shop has elaborate equipment and labor-saving tools, as the photos on page 188 show, but the quick-change job is done with just the things that any motorist might lay his hands on.

In this, you have the key to the character of a real expert. He uses his tools, but doesn't depend on them to do the whole job. To the tools, he adds the skill of his hands and feet—plus a liberal amount of common sense.

In the quick-change tire job, these are exactly the ingredients you'll find. Taken together, they add up to a task well done.

Copyrighted material

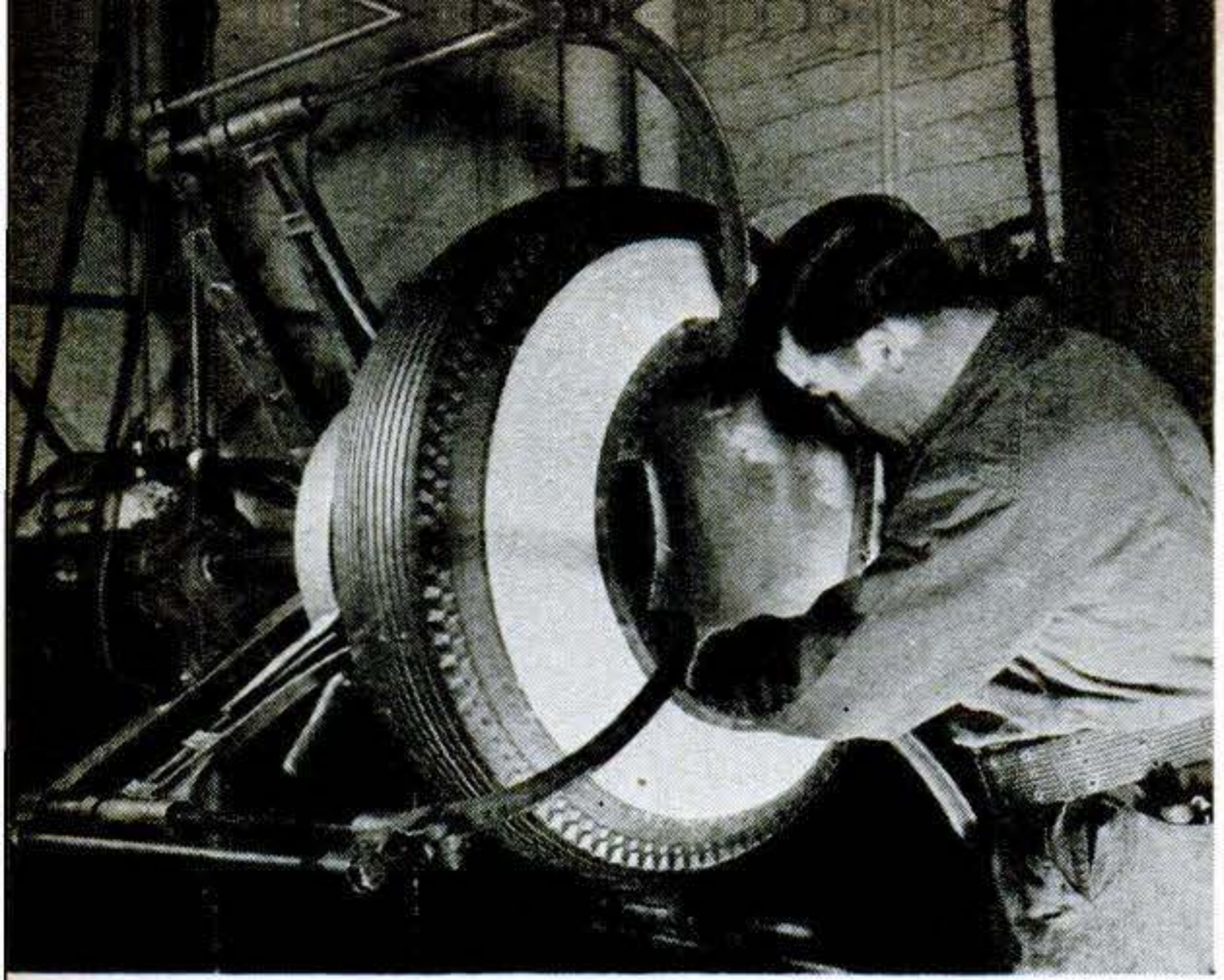
6. Apply lubricant. A vegetable compound in paste form is applied to tube and bead with a brush. Acting as a lubricant, this allows the tube to seat properly, prevents rust on rim.

7. Pry on back bead. A tire iron quickly slips the inside bead over the rim after the valve stem has been lined up. When bead is on, the mechanic starts the stem through its hole.

8. Heave ho—and it's on. Here's the key to the job. Using one iron, plus knee and arm pressure, mechanic quickly works bead into its well. He presses with knee while turning tire.

9. Some air, and job's done. Holding the stem with his thumb, he puts air in the tire before removing jack. This job took less than 4 min. Some mechanics in the shop work still faster.

Copyrighted material

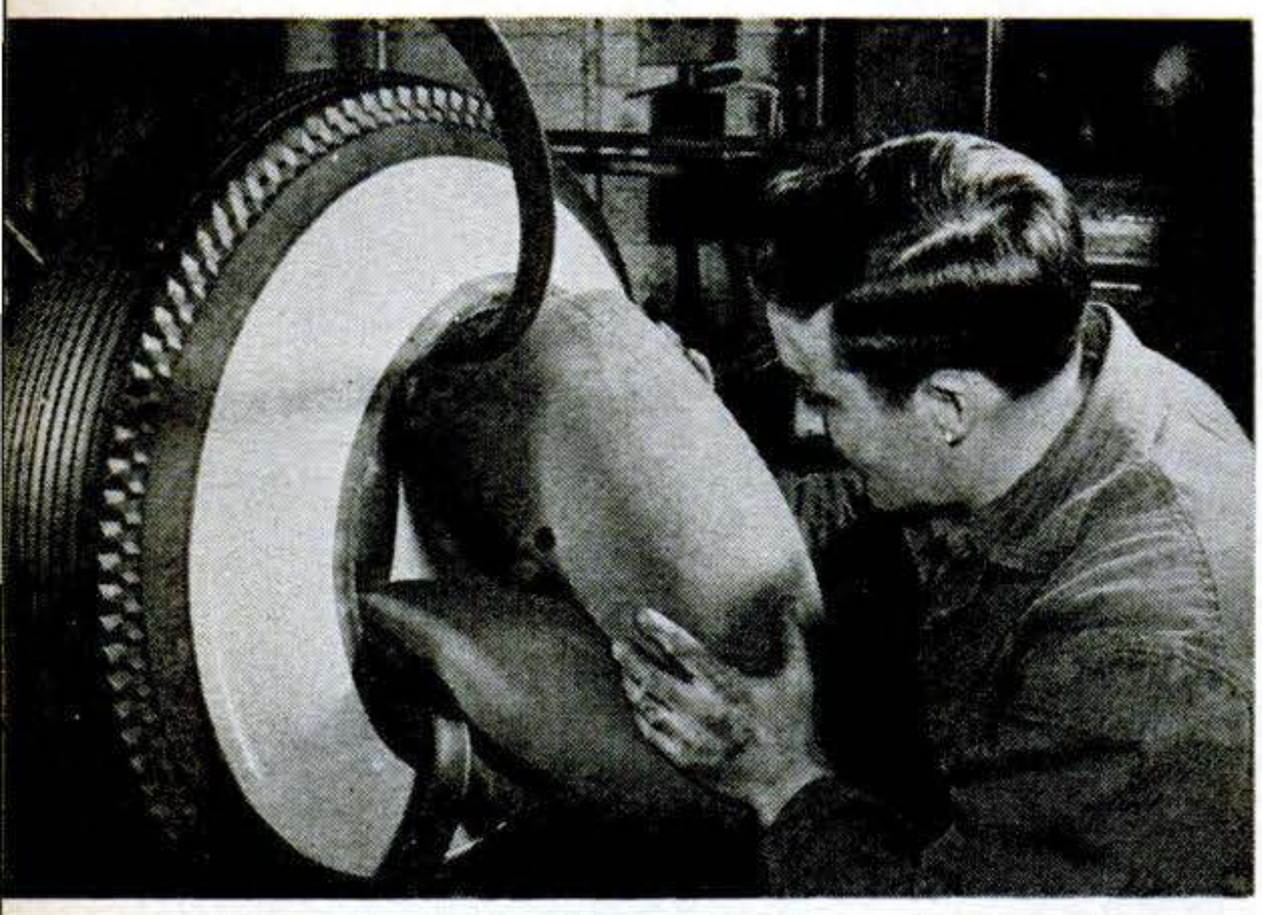


Tire spreader operated by air pressure pulls the side walls far apart. With a used tire, this enables the mechanic to spot any cuts or breaks in the fabric on interior of the casing.

Specialized Tools Aid Tire Mechanics

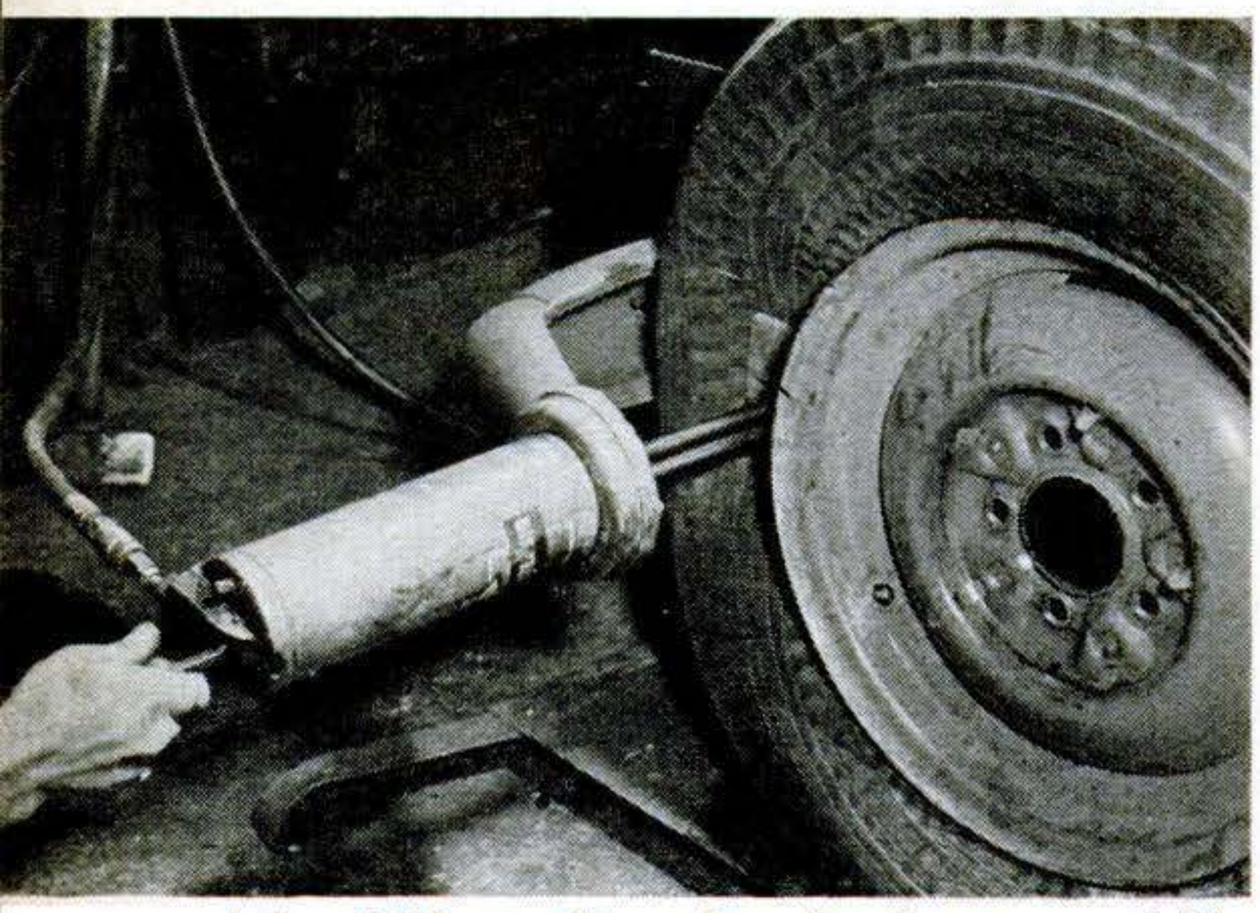
ALTHOUGH changing a tire without removing the wheel saves time, it's sometimes necessary or convenient to do the job the old-fashioned way. At the New York General Tire shop, however, you'll find equipment that's anything but old fashioned.

Some of the shop's labor-saving tools are shown in these photos. Several are used in almost any tire shop. Others are not so common. In addition, the General shop has complete equipment for balancing wheels, an important step in these days of lower tire pressures. And for truck work, there's a big air hammer to loosen stubborn beads.



Spreader also is used for easier insertion of the puncture-proof tube made by General. This tube is much heavier than the ordinary type, and it's difficult to insert in usual way.

Greasy hands never touch white wall when the mechanic uses this tool. It consists of pedestal with a shaft to hold wheel. Turning the guide once around slips the bead on the rim.



A bead "frozen" to rim after long use quickly yields to this air-operated tool. As valve is turned on, a pressure foot kicks tire inward. Several strokes around the tire loosen bead.

Torsion wrench turns up the lugs to an exact tightness. They're tight enough to be safe, but still can be loosened with an ordinary lug wrench if you're caught with a flat. END

Copyrighted material

Mechanics and Handicraft

REG. U. S. PAT. OFF.

New Screens at a Saving PAGE 240

Chests from Orange Crates PAGE 196

Quick-Heat Soldering Iron PAGE 216

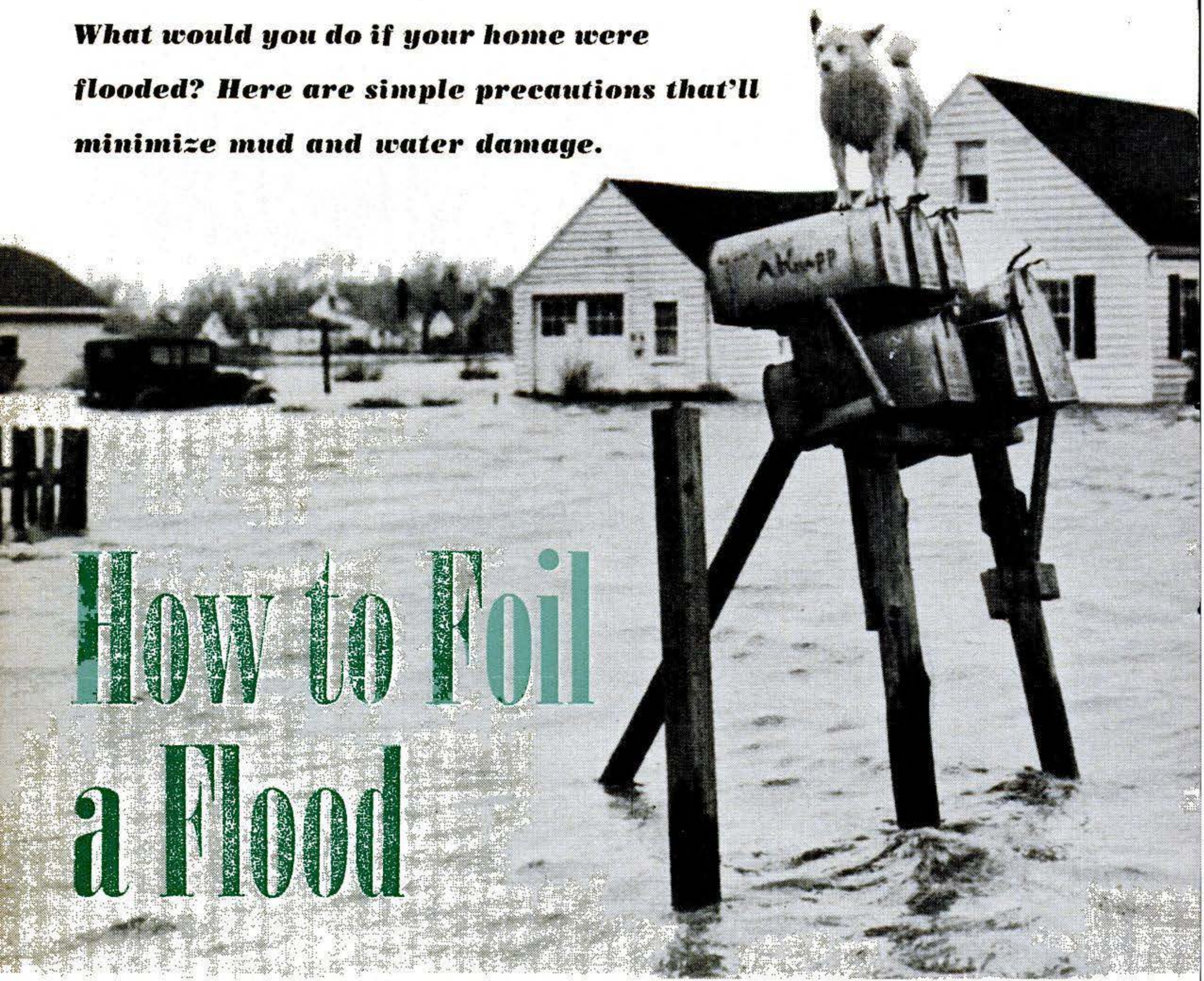
Copying Without a Camera PAGE 222

4-Way Radio Saves Batteries PAGE 227

Be comfortable all summer with low-cost homemade screens. See page 240

Copyrighted material

What would you do if your home were flooded? Here are simple precautions that'll minimize mud and water damage.



How to Foil a Flood

Photo by Chicago Sun

By Volta Torrey

YOU'VE seen a lot of photos of other people's homes half submerged by swirling, muddy flood waters. A great many of those persons never expected the water to flow over their window sills. So they made mistakes that increased their losses and suffering.

That need not happen to you. All by yourself, you probably can do more than you suspect to foil a flood. Of course, you can ask your insurance agent about coverage for flood damage, but you are liable to find that it would cost a wad of money. There are precautions, nevertheless, that you can take without spending a cent.

Just ask yourself these questions now: ***How high would water have to rise to reach your home?***

Most floods can be seen coming. Government engineers frequently can predict the height to which a river will rise 24 hours in advance. But much property is lost in almost every flood because people fail to understand the warnings. They don't know whether or not a flood cresting at the number of feet specified in the warning will affect their homes.

In many communities, the Red Cross has prepared maps that show what streets and lots will be covered if a river rises 20, 25, 30 feet, and so on. By consulting such a map now, and remembering the stage at which the water would hit your home, you may save yourself a lot of time and trouble.

Which way would you go, and what would you take with you, if a flood were coming?

Never plan to sit out a flood on the second

Copyrighted material

floor or the roof. That's the way lives are lost. You can usually escape a flood, without even getting your feet wet, if you start in time and know where you're going. Consult the Red Cross now if you are uncertain.

There usually is time enough, if you understand the warnings, for you to remove the things you'll need for your children and yourself. Forgetfulness, though, may be as annoying as the water. Pack your bags as though you were leaving for a vacation. Take your good clothing and toilet articles.

After you've removed the things you'll need most, think of the articles you'll want first when the water recedes. Take your washing machine, if you can—and shovels, rakes, mops, brooms, and boots. Toss a sack of clean rags in your car, too, because the demand for them probably will exceed the supply after the flood.

Then ask yourself: Are there heirlooms or other things dear to you that never could be replaced? How about your deed, military-service papers, war bonds, jewelry, musical instruments? And don't forget your glasses.

What would you do before the flood to minimize damage?

People who know what floods are like can accomplish an astonishing amount of work before the water begins to lap at their doorsteps. They lug their canned food, and everything else that's movable and valuable, up out of the basement. They douse the fire in the furnace and shut off the utilities at the mains.

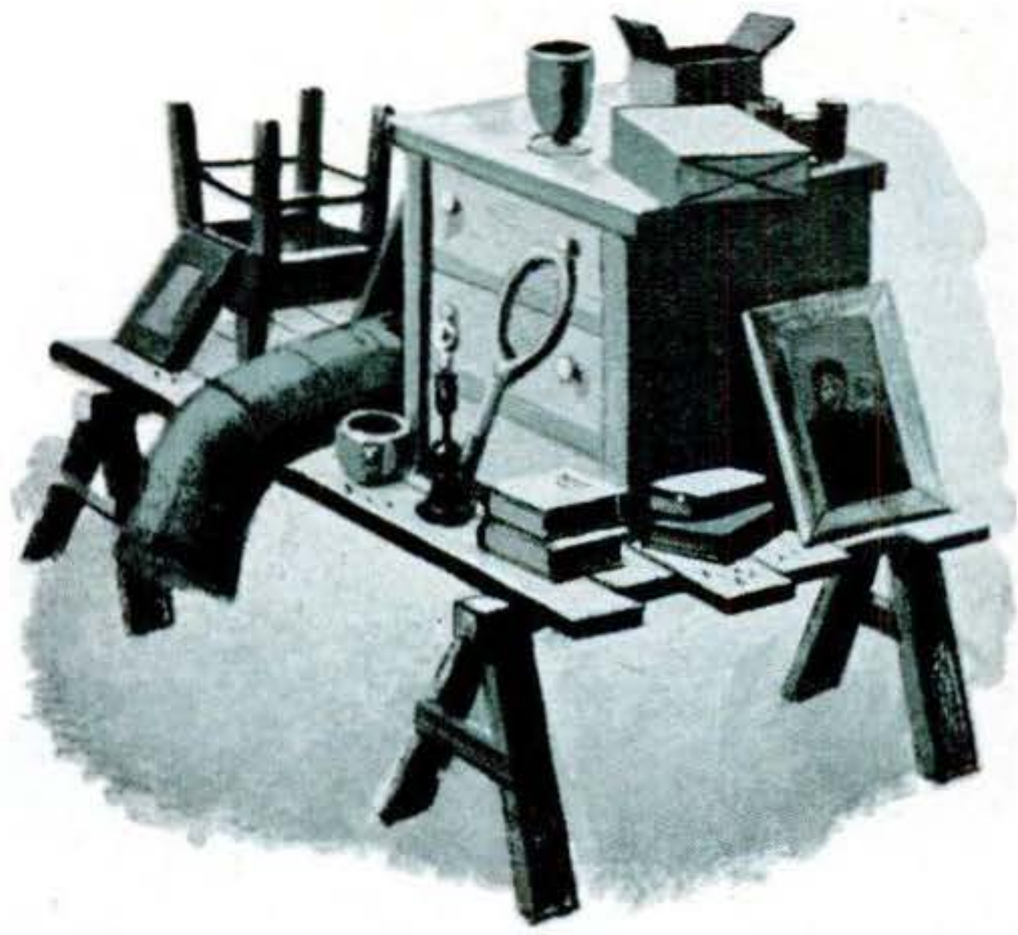
Then they start with the first-floor rugs and move everything possible to the second floor or attic. Even a small attic will hold an amazing number of articles in an emergency. And what's left often can be stacked on a scaffold made by placing planks across sawhorses or sturdy boxes. Contrary to some folks' opinion, shifting the weight upward in a house does not increase the danger that the building will be washed away.

Experienced flood fighters hoist up the radio and the veneered or plywood furniture before they struggle with solid pieces, since the latter are less susceptible to water damage. They are careful not to place rugs or heavy articles on frail tables or wooden beds that might collapse. They stack their dishes and pots and pans in baskets, and put these, along with drawers of linen and clothing, in the highest possible places.

Finally, they open the windows wide and prop the doors open firmly. This makes

After you've removed immediate necessities from a flood-periled home, move everything possible to the attic or an upper floor.

Rubber hose or a piece of roofing over the teeth of a rake makes an excellent squeegee for shoving mud out of a house.



Planks and sawhorses, or even big packing boxes, make good platforms to hold pieces of furniture out of reach of the water.

Copyrighted material

it as easy as possible for the water to flow through the house. There's likely to be only about a tenth as much mud left in a house that is wide open as in one that is closed.

What's the most sensible thing to do while flood waters are pouring through your house?

Get plenty of rest.

If you wear yourself out running around or rowing around just to see what's happening, you'll regret it later. The best course is to report immediately to disaster headquarters, and take whatever inoculations or other health precautions are recommended. Don't linger in a danger area, no matter how exciting it seems. That's the way people get hurt.

Don't wade back to your home until you're sure you can get both to it and from it safely. Then take a broom or long stick and keep poking the ground ahead of you. The flood may have washed out ugly holes, even in pavement and sidewalks, and you may get a nasty fall. Don't wade around barefooted; there's likely to be broken glass in the muck.

Never enter a building that has been flooded without first making sure that it won't collapse. Even if it still seems solid, proceed cautiously. You might get hit on the head by a chunk of falling plaster. There's no telling what you'll find. When Red Cross workers entered one home after a recent flood, they found a cow on a bed.

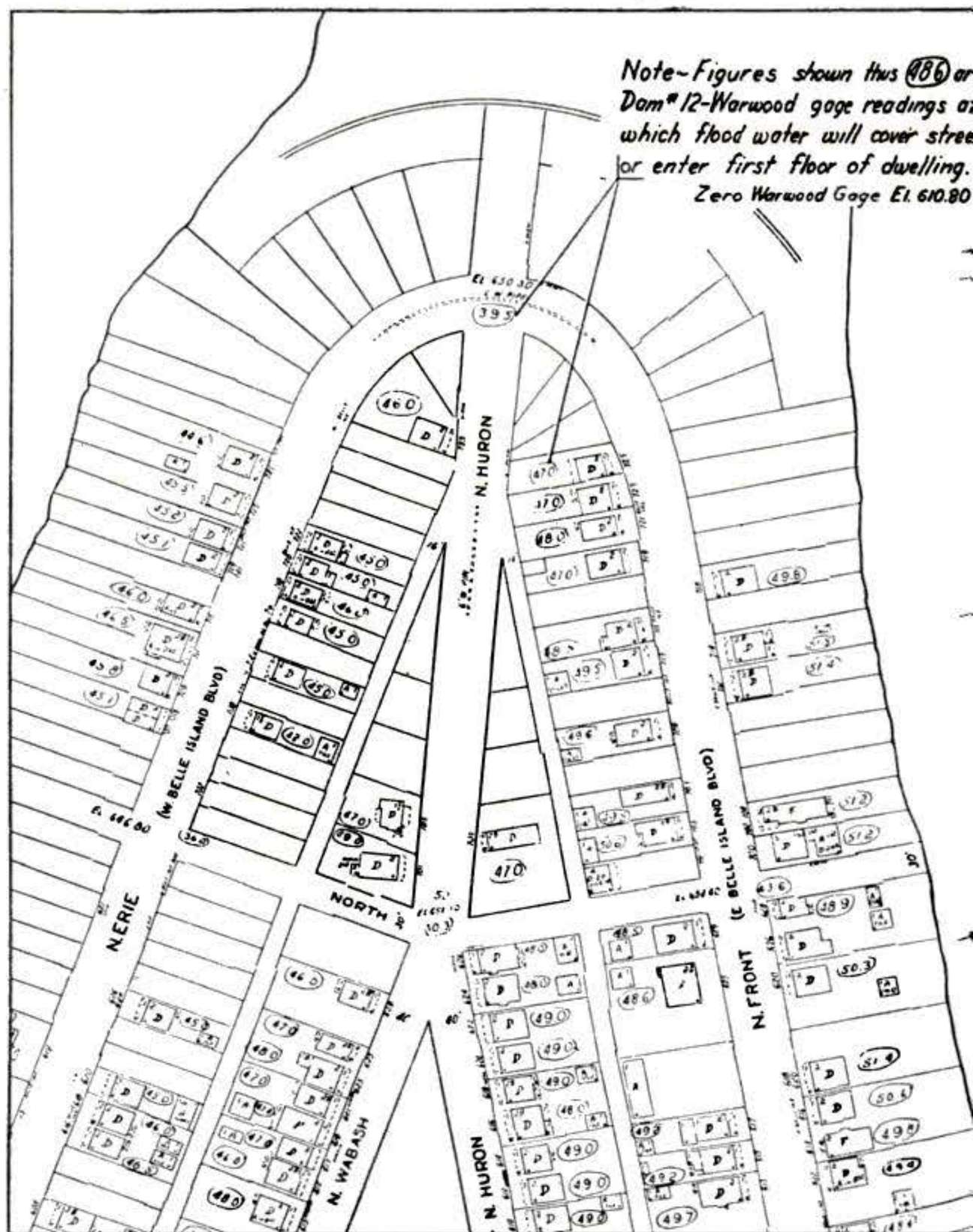
How would you clean up several inches of mud in your home?

Cleaning up after a flood is an appalling job—but some ways of doing it are not so difficult as others. Don't be discouraged by the odor. The wind usually will take care of it if you keep the house wide open.

If a door will not open normally, remove the hinge pins and shove it out. If the windows are so swollen that you can't move them, take out the sashes and lift them out.

Carry everything you can out of every flooded room. Then, if you have a source of water and a hose, wash the mud out the way you'd wash a street. You can make an excellent squeegee by putting a section of rubber hose, or a strip of roofing, over the teeth of a rake or the edge of a snow shovel.

Take up linoleum immediately so mud and water won't remain under it. Remember, too, that it's cheaper to repaper a wall than replaster it. So don't try to save badly soaked and soiled wallpaper. Pull it off wherever it's loose. Do this gently lest you loosen the keys that hold the plaster to the laths.



Block maps like this show at which stages flood waters will surge into each dwelling.

Your floors and woodwork are likely to buckle or warp if they remain wet very long. But by removing the mud and exposing the wood to the air, you can reduce the damage. A buckle in a floor sometimes can be face-nailed down and mended later. Don't attempt permanent repairs while the wood is still damp.

Should you immediately fire up the furnace to dry things out?

You shouldn't—until you're sure it can be done without damaging the heating plant. Flood waters are likely to leave silt everywhere, and mud in the flues or passages might cause your heater to burst. Clean them carefully with a hose or a swab on a long stick. Take the smoke pipe out of the chimney, too, and reach through the thimble to remove any mud that may have settled there.

Look your chimney over carefully, too. The water may have eaten away mortar between bricks, leaving openings that

Copyrighted material

Can this happen to your home? Thick layers of smelly mud coat the floor of this wrecked house in Montrose La Crescenta district Los Angeles County. Water smashed furniture through wall.

should be repaired. Most chimneys stand on foundations in the ground. These should be checked to see if there has been undermining.

If you have an oil-burning system, make sure water and dirt haven't gotten into the tank. Dismantle the burner and clean all parts with gasoline or kerosene. The air blower and fuel pump should be cleaned too. You may discover, even in gear housings that seem tight, that mud has seeped in.

Finally, when the system can be started safely, be careful not to overheat a damp house. That might release vapor that would actually delay the drying.

What would you do about wiring and household mechanical equipment?

Utility companies have to be cautious about restoring service after a flood. Don't demand that they endanger your own or other people's lives. All wiring must be checked. All motors, pumps, washing machines, sewing machines, and other mechanical equipment must be taken apart, thoroughly cleaned with gasoline or kerosene, and dried. Windings should be baked in a slow oven and carefully tested for shorts.

What should be done with furniture?

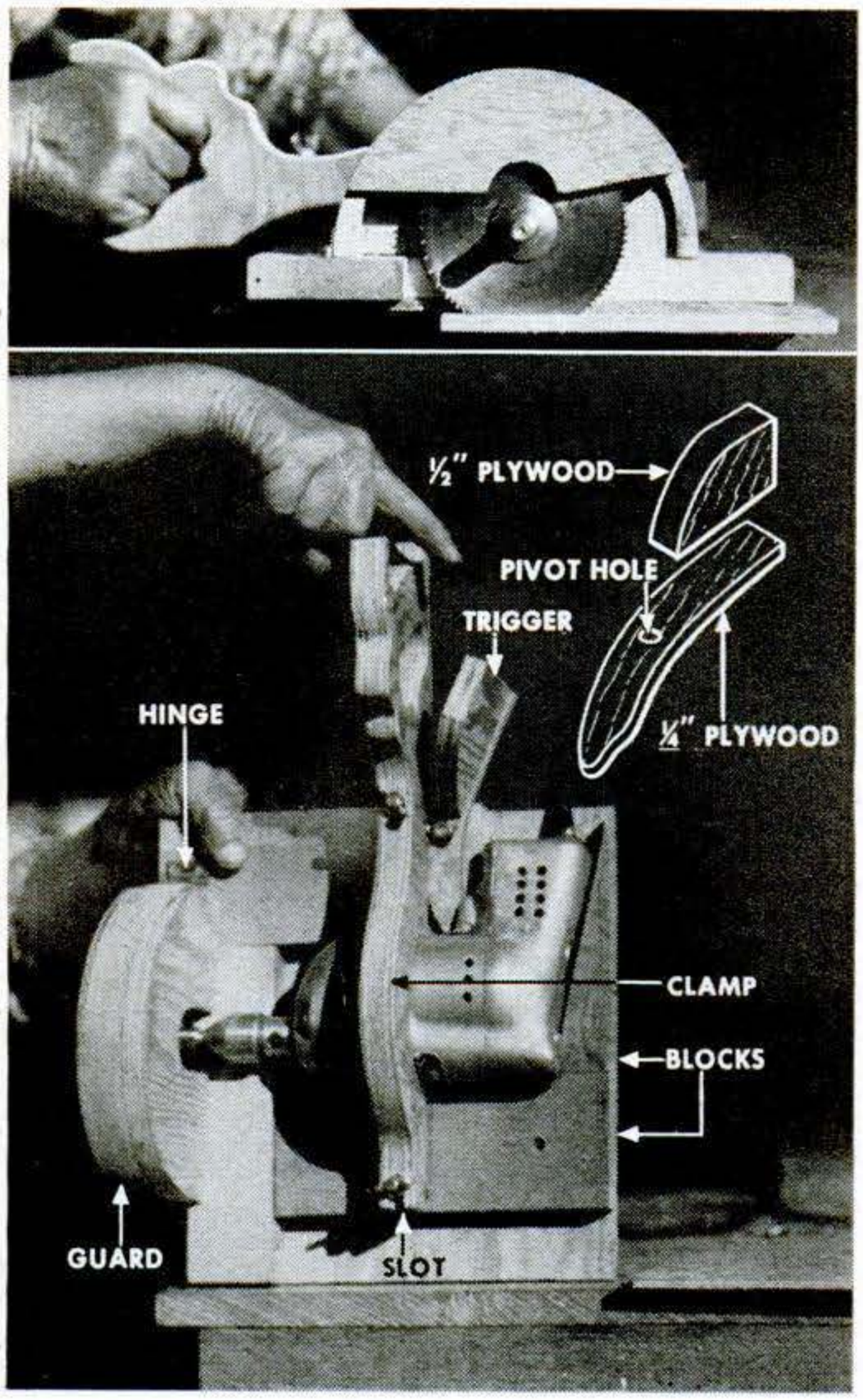
Take all wet furniture outdoors as quickly as possible and remove all movable parts such as drawers. Don't try to pry out stuck drawers. Remove the back and push them out. Next, clean the furniture and store it. Leaving it in the sun may cause warping.

Books are very difficult to save. Stand them on end with the pages open. As soon as they have dried a bit, stack them to prevent the paper from crumpling. Then stand them on end again. You may save them by such alternate drying and pressing.

Could you intelligently direct strangers willing to help clean up?

Americans are quick to lend a hand after every disaster. Volunteers, eager to work, show up before the victims have decided what to do first. Much of this labor is wasted when home owners aren't prepared to direct it intelligently. So look your home over now to see what you'd do and how you'd want it done if a flood comes. END

Copyrighted material



Converting Drill to Saw

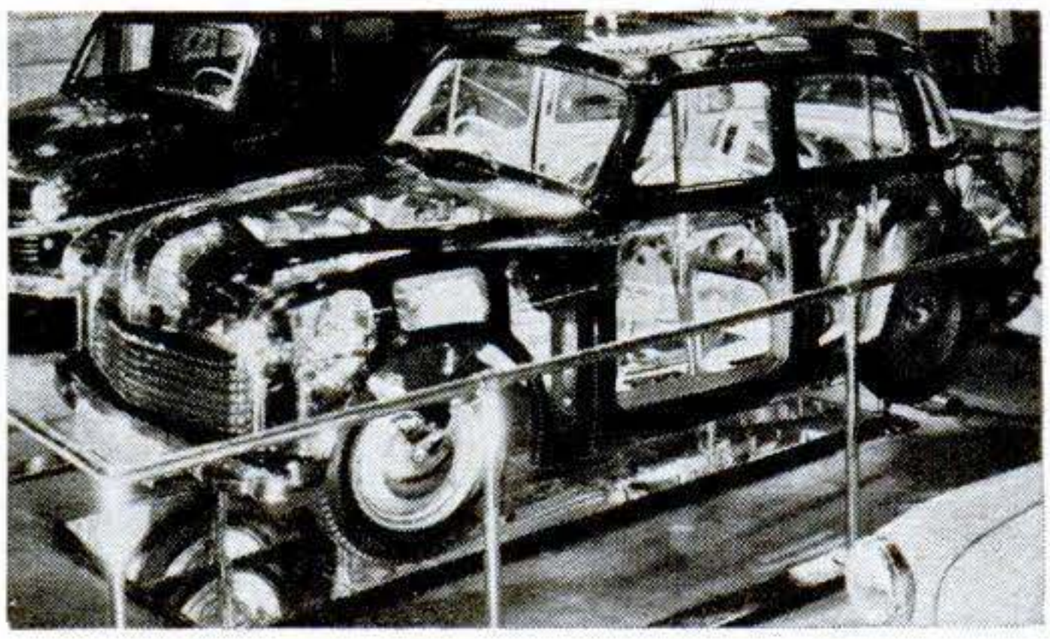
HELD fast in a frame with a 4" circular saw in the chuck, a ¼" electric drill becomes a very useful portable electric saw. I've found it particularly handy in cutting up large plywood panels.

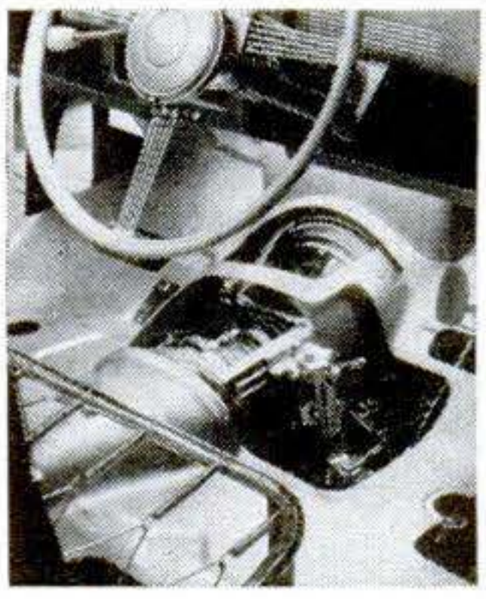
No dimensions are given since drills vary in size and shape. Lay the drill on a bottom piece of ¼" plywood so the chuck extends beyond an edge. Be sure the spindle is parallel to the bottom, and at 90 deg. to the edge. Screw short lengths of 1" by 2" stock to the base to locate and hold the drill housing accurately. Cut a clamp from ¾" plywood to fit the contour of the drill. Bore the clamp for two stove bolts and wing nuts. Shape one end of the clamp like a saw handle. Make the guard of ¾" and ¼" plywood, securing it at one end with a small butt hinge. The trigger is another piece of plywood, pivoted on a stove bolt. The thumb of the same hand that holds the saw can operate the trigger. A threaded shoulder arbor holds the saw blade in the chuck. Mount the blade so it cuts from the bottom up instead of from the top down. With my drill mounted on a ¼" base, a 4" blade has a ⅜" depth of cut. A 1/16" sheet steel base gives a ½" cut.—*Pio Panieri, Roslyn, Wash.*

Bags Protect Clothes

TRANSLUCENT Vinylite® bags keep clothing fresh and clean on auto trips. Hung in the car, the dustproof zippered bags can be moved right from the car to a hotel room. The retail price is about $1.60. Keko Products Division of Kennedy Car Liner & Bag Co., Inc., of Shelbyville, Ind., is the maker.

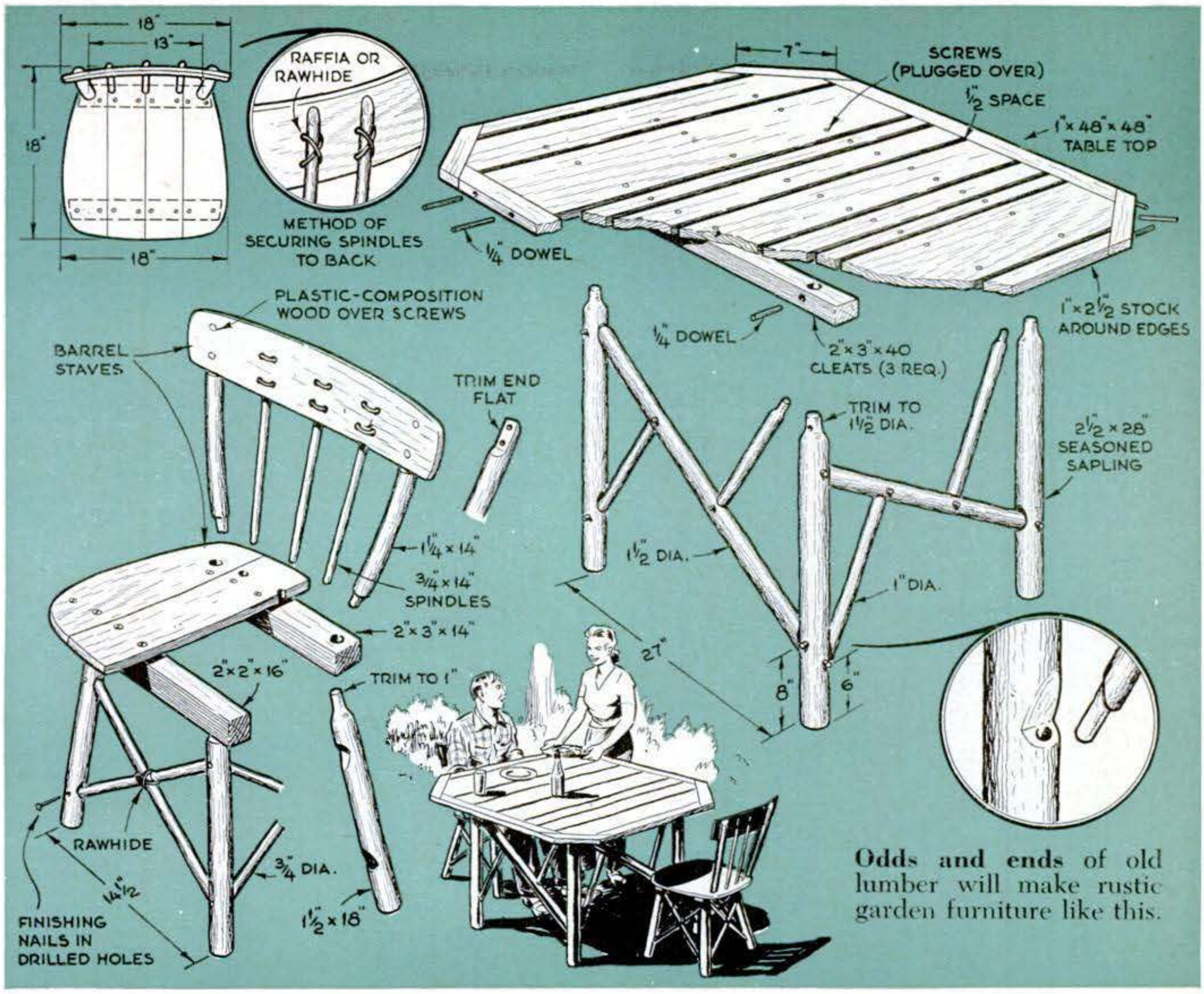
Transparent Car Exhibited





Now touring the United States is a full-sized plastic and steel model of a new British car, the Hillman Minx. Many of the car's moving parts can be seen in actual operation through the transparent plastic. The model, being displayed by Minx dealers, was built by apprentice engineers. Smaller than the average American car, the Minx is a 4-cylinder sedan.

Copyrighted material



Odds and ends of old lumber will make rustic garden furniture like this.

Furnish Your Garden with Saplings and Staves

RUSTIC garden furniture comes high these days, but chances are that you can beat those costs with odds and ends from almost any woodpile. Old boards from a fence or shed, for instance, will do nicely for the top of a weatherproof table, while barrel staves can be turned into backs and seats of chairs.

Use any available 1" boards for the table top; random widths add to the informal effect. Space them ½" apart on three 2" by 3" cleats. None of the cleats need be finished lumber. You may wish to plane down the boards of the top, though. Drill two of the cleats for the tops of the legs.

Screws that go through the top boards are countersunk and plugged over with dowels. The border pieces are secured with dowels. Cutting away the corners eliminates sharp points that serve no useful purpose anyway.

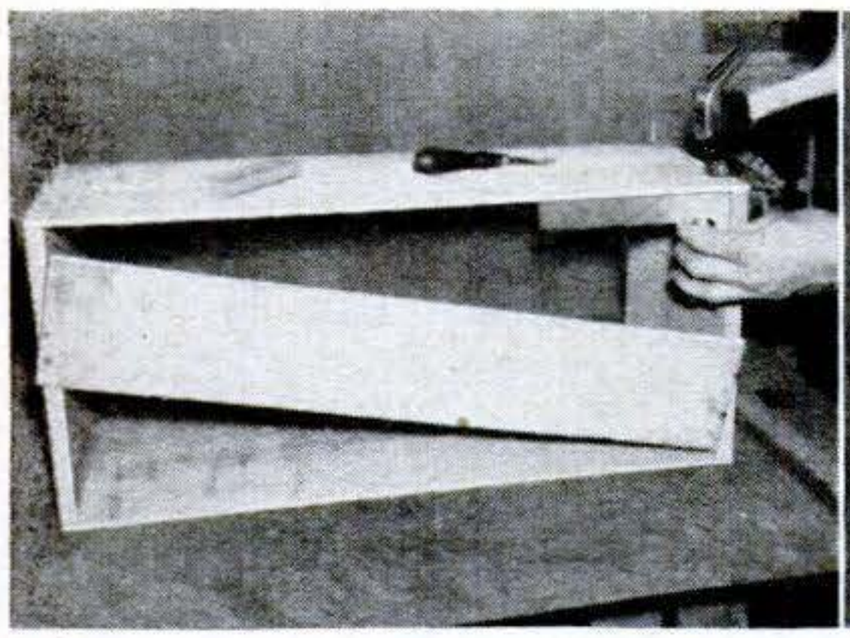
Construct the legs and bracings of seasoned saplings. Green wood will shrink and the joints will loosen. When you assemble the parts, use waterproof glue at all points, including the dowels.

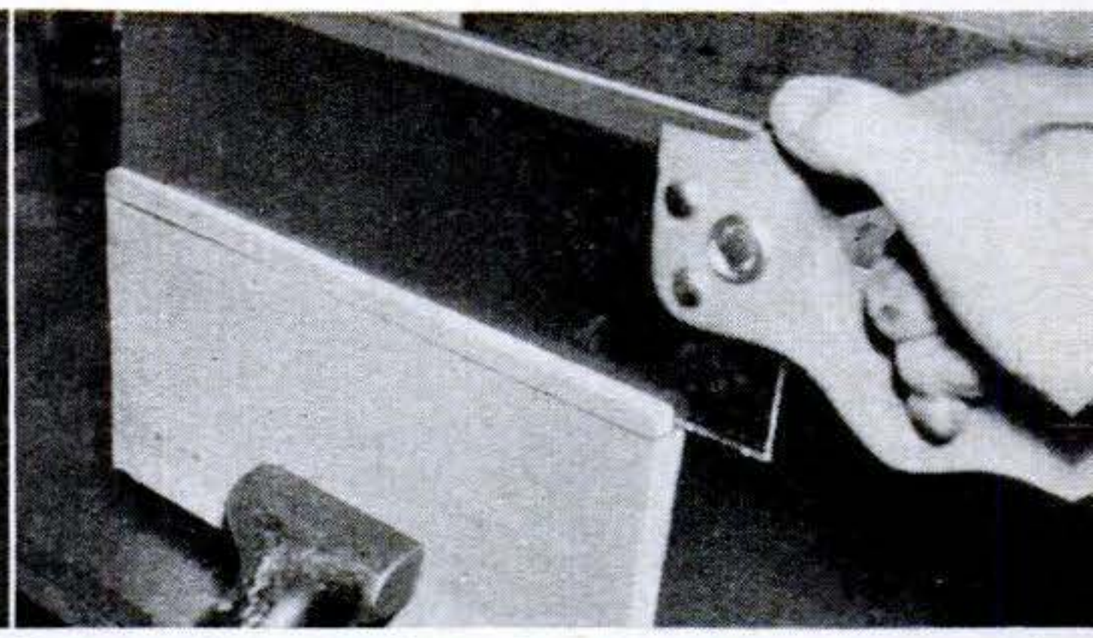
Barrel staves make comfortable seats and backs for chairs. If available, make the supporting posts of the chair backs of slightly curved pieces. Secure the spindles at the top with rawhide or raffia and fit them into holes in the seat at the bottom. Countersink the screwheads in the seat and back just enough to cover them with composition wood.

This type of furniture should not be painted. Just leave it out and the weather will mellow it. It's designed to take it and, as constructed, will not come apart. Skin the bark off the saplings before using them. Otherwise, they will in time present a scaly appearance.—*Hi Sibley, Nuevo, Calif.*

Copyrighted material

Heavy, washable wallpaper and a few hand tools transformed these discarded fruit crates into this set of matching chests. Such chests can be used individually, in groups, or stacked.

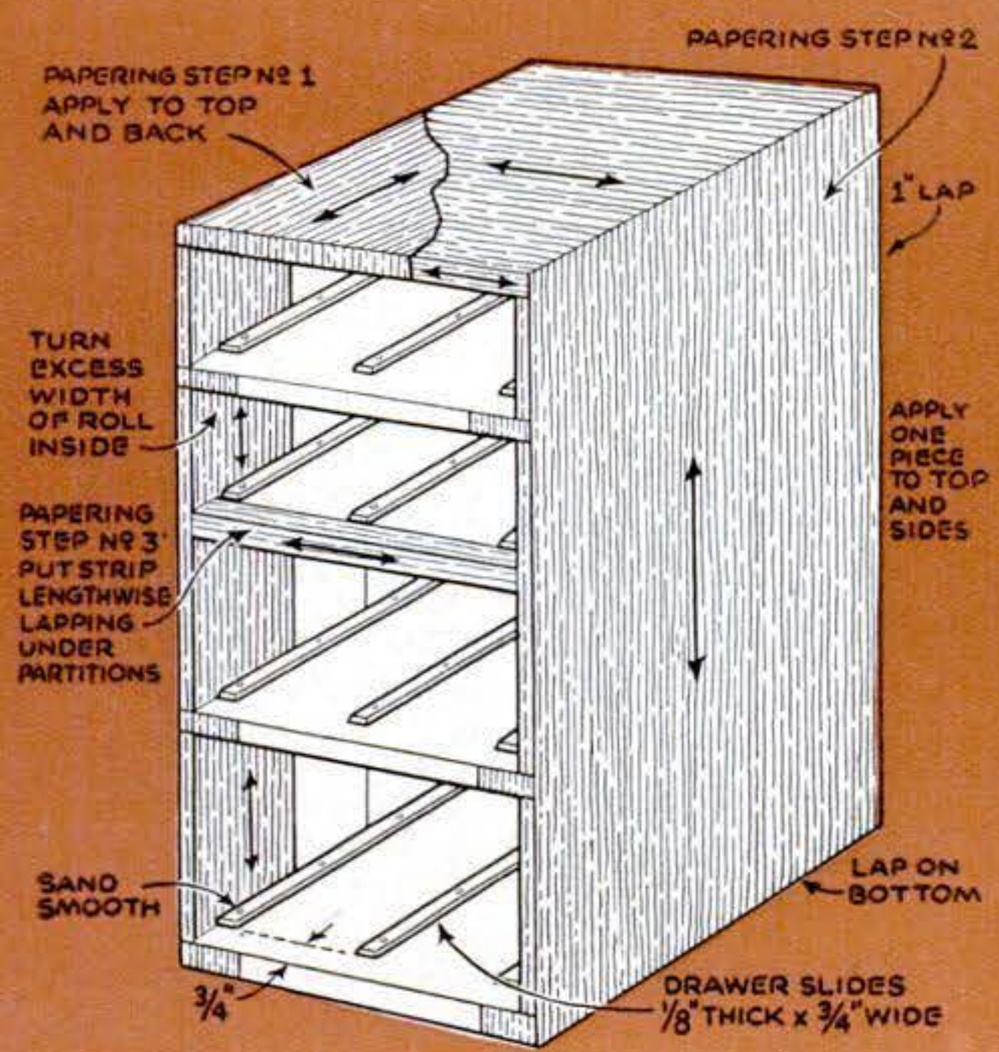




When you reassemble the crate lumber, butt the boards against each other. To aid in nailing on the ends, a sidepiece can be temporarily nailed in place to help keep ends square, as shown at left. Before installing the drawer partitions, nail and glue the slide strips to them, center. The rabbet joints where drawer fronts join bottoms can be made with a back saw.

Copyrighted material

Chests Start Life as Orange Crates



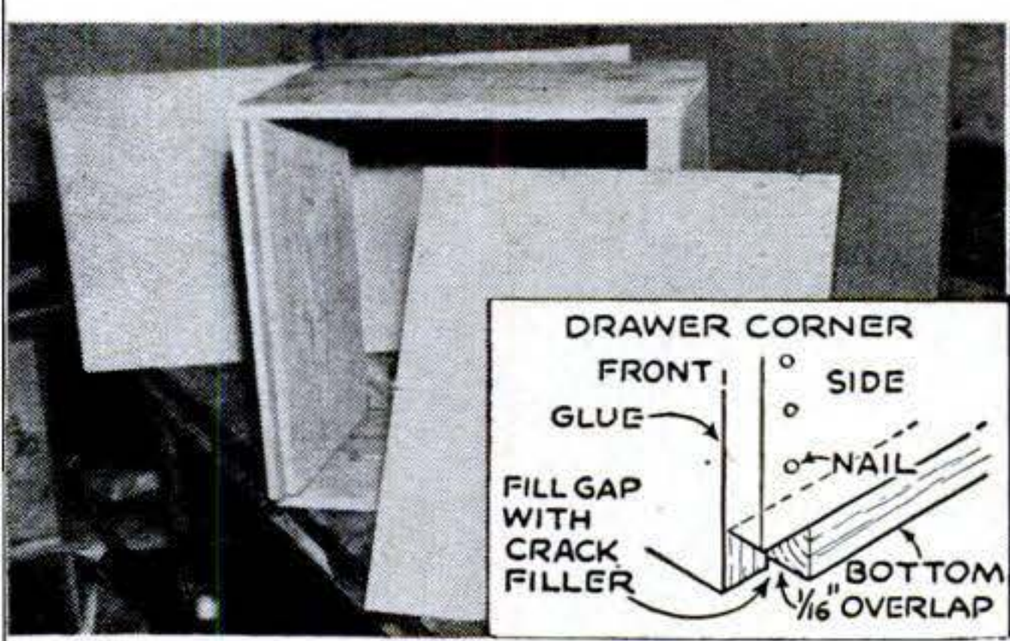
FRUIT-CRATE furniture needn't shout where it came from. Surprisingly attractive chests of drawers, for instance, can be built from beat-up orange crates. The trick is twofold: first you take them apart and rebuild them without cracks and gaps, and then you cover them with heavy wallpaper. With practically all store furniture a pain in the pocketbook these days, this stunt can save you plenty.

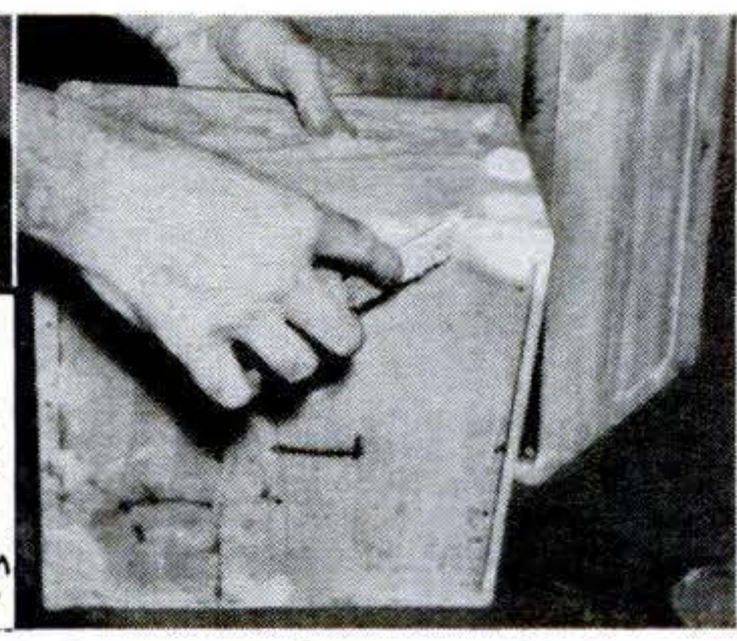
Disassemble the crates carefully with a claw hammer and a tack puller. Put the pieces for the top, bottom, and drawer partitions together. Size them alike, if necessary, with a saw and plane. Reassemble one crate without partitions and with the boards butted tightly against each other. A board nailed temporarily across the front will help hold the endpieces square while nailing the sides.

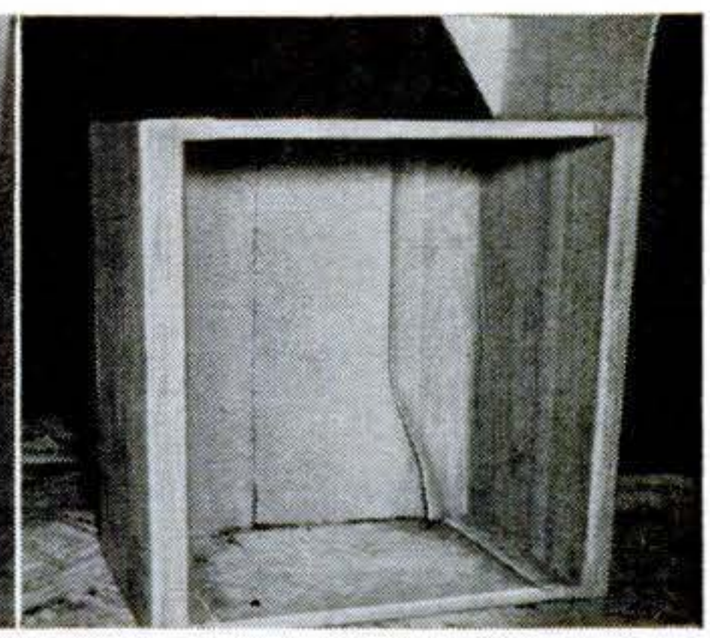
Before installing the drawer partitions, nail and glue three drawer slides to each one. Build the drawers to fit the openings, leaving 1/16" clearance on each side and the bottom. This allows for papering and necessary looseness. The rabbet joint where a drawer bottom and front join can be made with a back saw.

When drawers and frame have been completed, use plaster-type crack filler to plug all holes, dents, and cracks, first moistening the wood around the area. Let harden overnight and then sand smooth.

Now you're ready to paste on the wallpaper. Gummed paper is not recommended. Use regular wallpaper. One with a woodgrain design is especially suitable. In applying the paper, first smear the wood with a very thin paste mixture, and then apply paste-coated paper. Fit the hardware and let the paper dry. Finish with paste-type furniture wax.—*Robert E. Zuber, Philadelphia.*

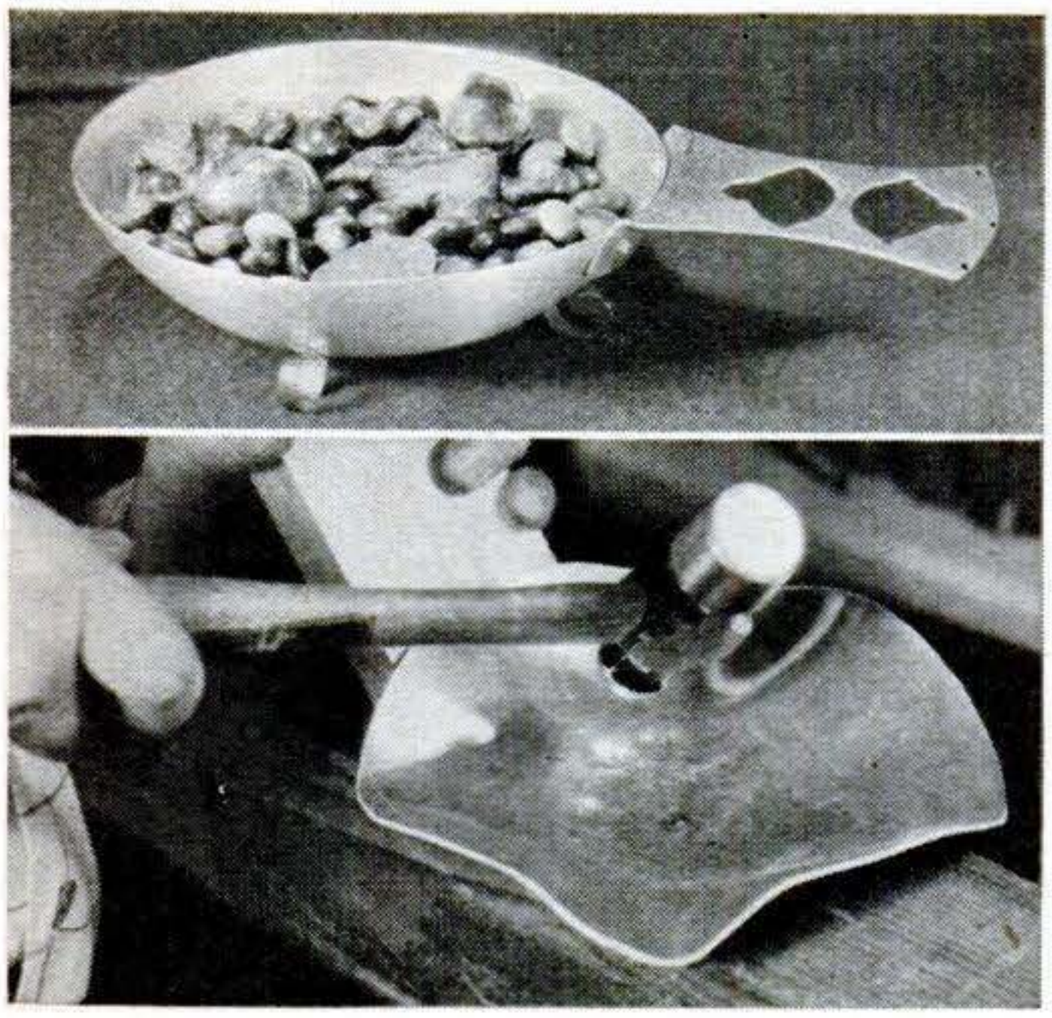


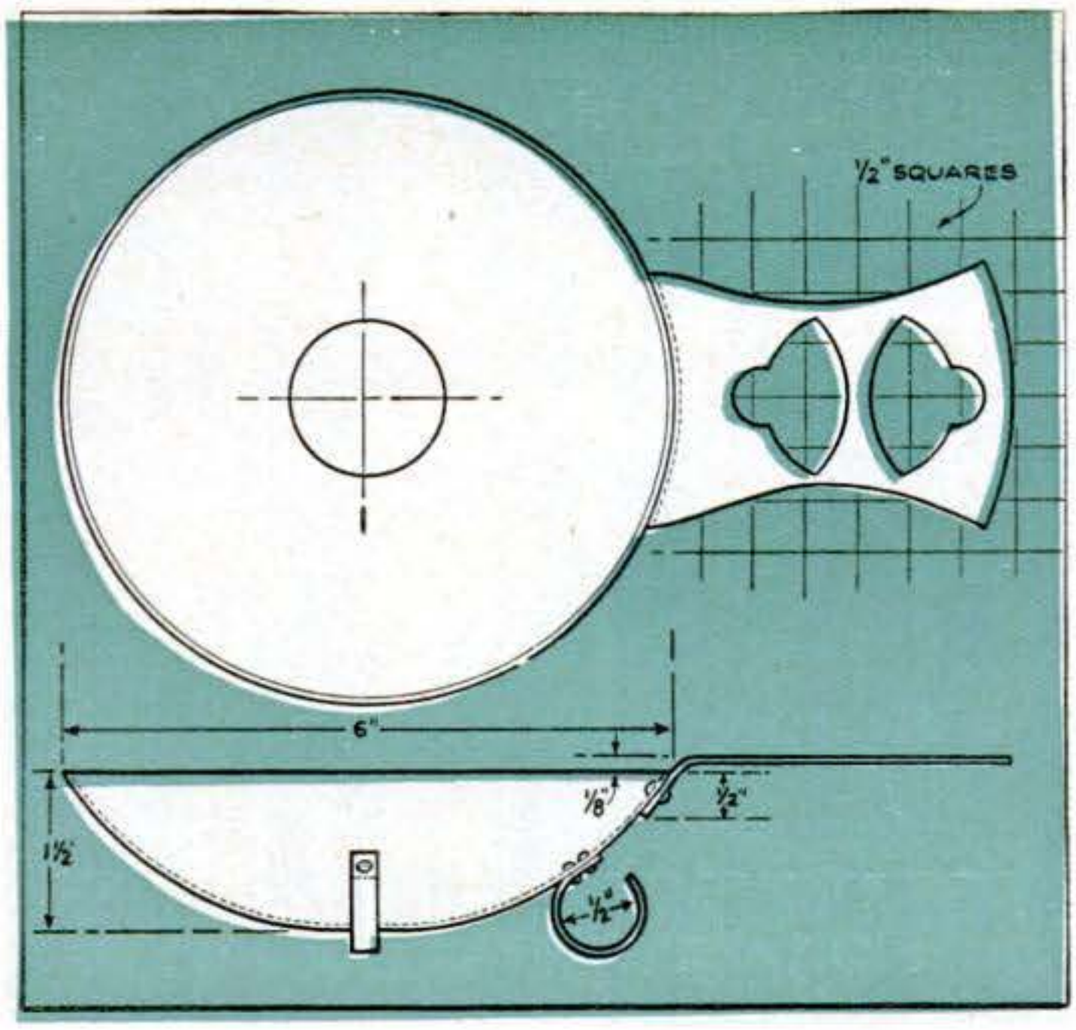




At left is an almost completed drawer with the bottom ready to be nailed and glued. After assembly, fill all cracks, dents, and holes with crack filler. Let it dry overnight and sand it smooth. Papering is the next step. Follow the drawing in applying the paper. Photo at right shows how drawer fronts and backs are each papered with one piece.

Copyrighted material





Porringer Hammered Out of Aluminum

THOUGH hammered out by hand, the bowl of this dish is finished in a smooth, spun-metal way that's usually associated with expensive pieces.

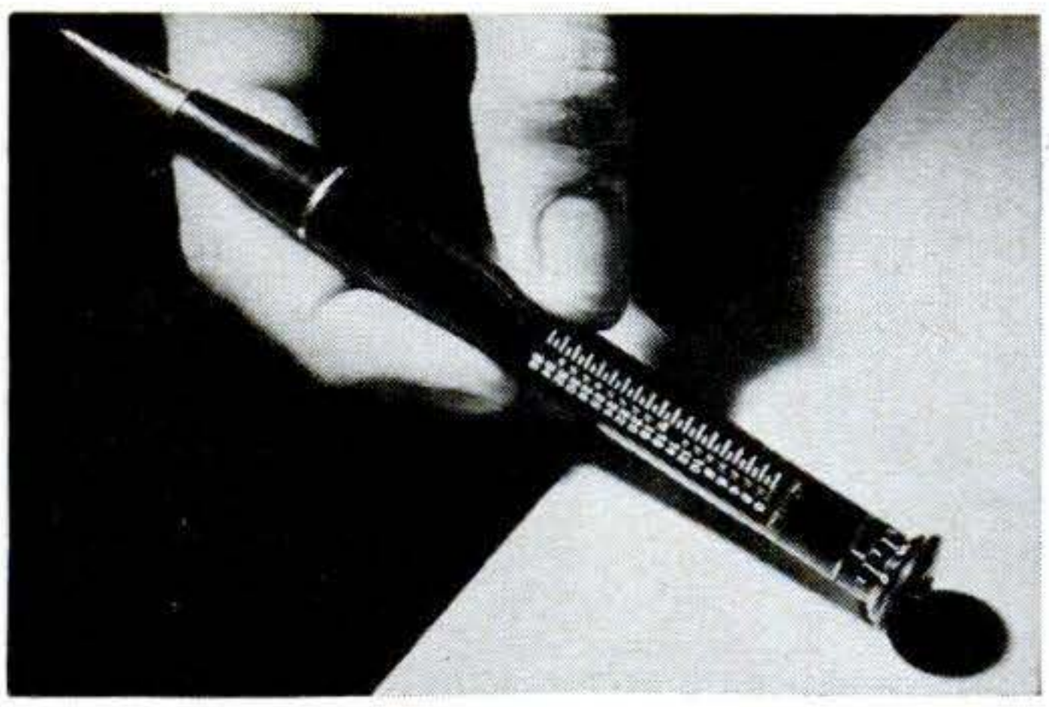
Use either .051″ or .064″ aluminum. Start by cutting a circle 7½″ in diameter. Use the same center to scribe another circle about 2″ in diameter as a hammering guide. Since I lacked a sandbag for a hammering base, I used a piece of fir four-by-four in a vise.

Hammer inside the 2″ circle until you have an impression about ½″ deep. This brings up the outer edge of the disk. Drill a hole through the center and fasten it to the four-by-four with a long wood screw. Later you can fill the hole with a rivet and file it smooth.

Use a backing block, as shown in the photo, and shape the base with a hammer. Strike it evenly and work regularly around the center. Symmetry of the bowl is more important than close adherence to the dimensions shown. After it's roughly shaped, remove the screw and hammer out any uneven spots. Then, with a bolt in the center hole, chuck the bowl in a drill press or lathe, being careful to see that it runs fairly true. Cautiously hold emery paper against the spinning bowl, moving it to cover the bowl inside and out. Stop and hammer out any spots that need it. Finish up with fine paper and then steel wool.

Cut out the handle, hammer the end to fit the bowl, and attach with rivets. Form the four legs from ¼″ by 2″ strips. Rivet one end of a leg to the bowl and then curve the leg around a piece of ½″ dowel.—*R. J. De Cristoforo, Bronx, N. Y.*

Automatic Pencil Records Inches and Fractions



As you roll the head of the Roller Rule ® along a surface, the indicator on the shank records distance of travel up to 36″. Fractions of an inch, down to 1/16″, are shown on the head. The maker, Roller Rule Sales Co., Los Angeles, says the pencil works on both curves and straightaways and on hard or soft surfaces. Map mileages, pipe circumferences, and tailoring measurements are a few of its many uses. The instrument is made of black plastic with the numbers inset in gold color. Price is about $2.

Copyrighted material

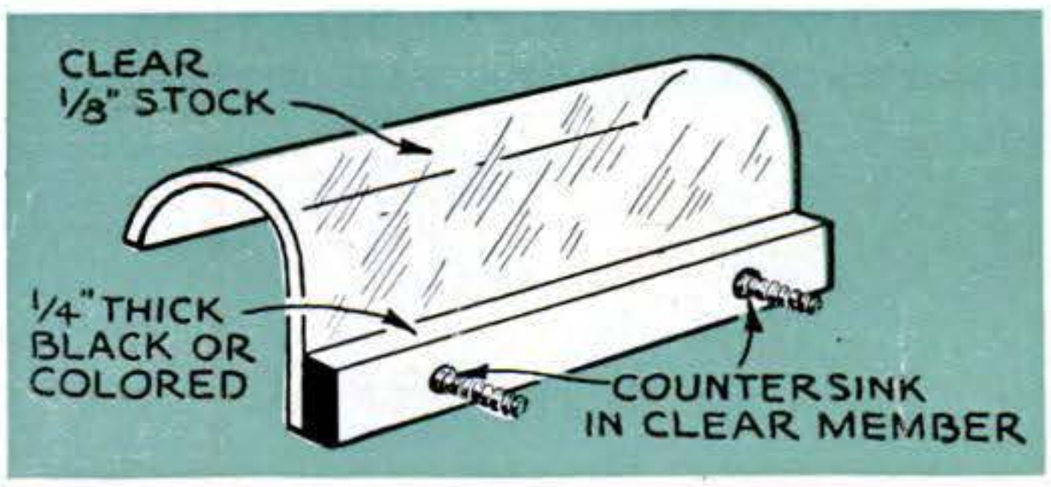
Plastic Pulls Give the Modern Touch

ACRYLIC plastics, with their characteristic sparkle, can add a decorative highlight to modern furniture. The drawer pulls shown here were created in the developmental studio of Rohm and Haas, Philadelphia, makers of Plexiglas®.

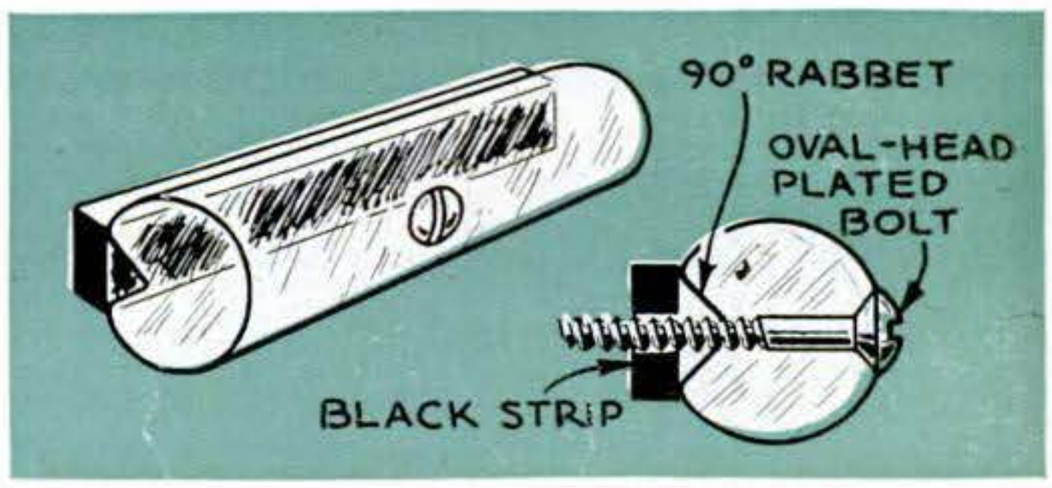
Turned handles are pictured above. The outsides are turned and polished and the insides are turned out to various shapes—a simple ring, multiple rings, or a center cavity. A center hole can be tapped for a mounting bolt, or the bolt can be set in plaster of Paris put in the cavity. Plaster turns the cavity white, making an interesting contrast with the crystal portion.

A shaped handle is shown in the lower drawing. It's formed from a blank about ⅛" by 3" by 6½". Cut it to shape, drill mounting holes, and heat in an oven until thoroughly soft. With gloved hands, shape the rounded portion about a 1¼" dowel or similar cylindrical surface, and the stand-off brackets over a rectangular piece of wood. Surfaces of the wood and dowel should be glass smooth to prevent printing off. If you want several pulls of this type, it'll pay to make the jig. Balsa is excellent for this.

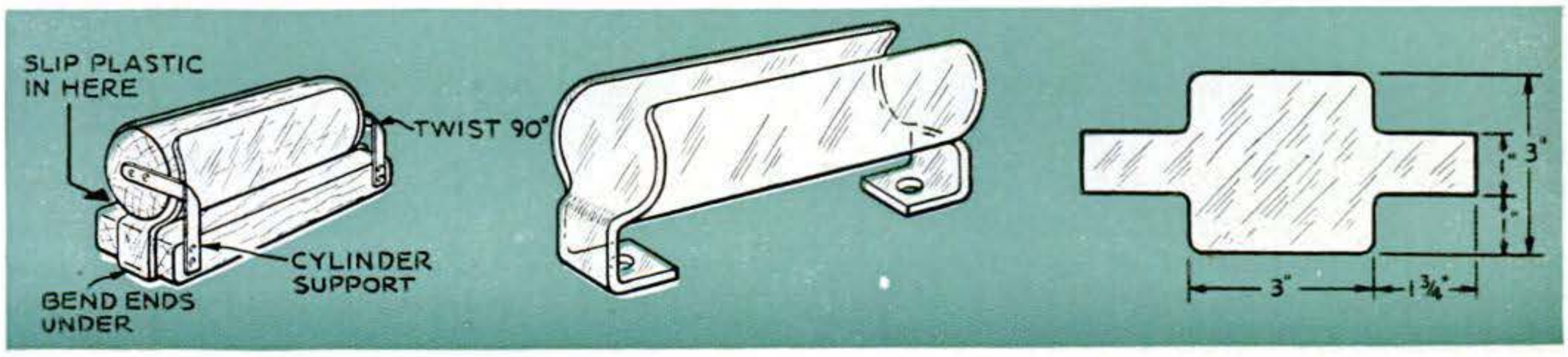
A shaped two-tone handle is set off by a strip of colored material. Another two-color pull is made of round stock and a strip. The 90-deg. rabbet is best cut on a shaper or circular saw, and should be polished. An interesting effect of light and dark is produced by the black strip.



Forming this simple handle is an easy bending job. Bolts hold it together and to the drawer.



Clear rod, rabbeted to 90 deg. and mounted over strip of dark plastic, forms this drawer pull.

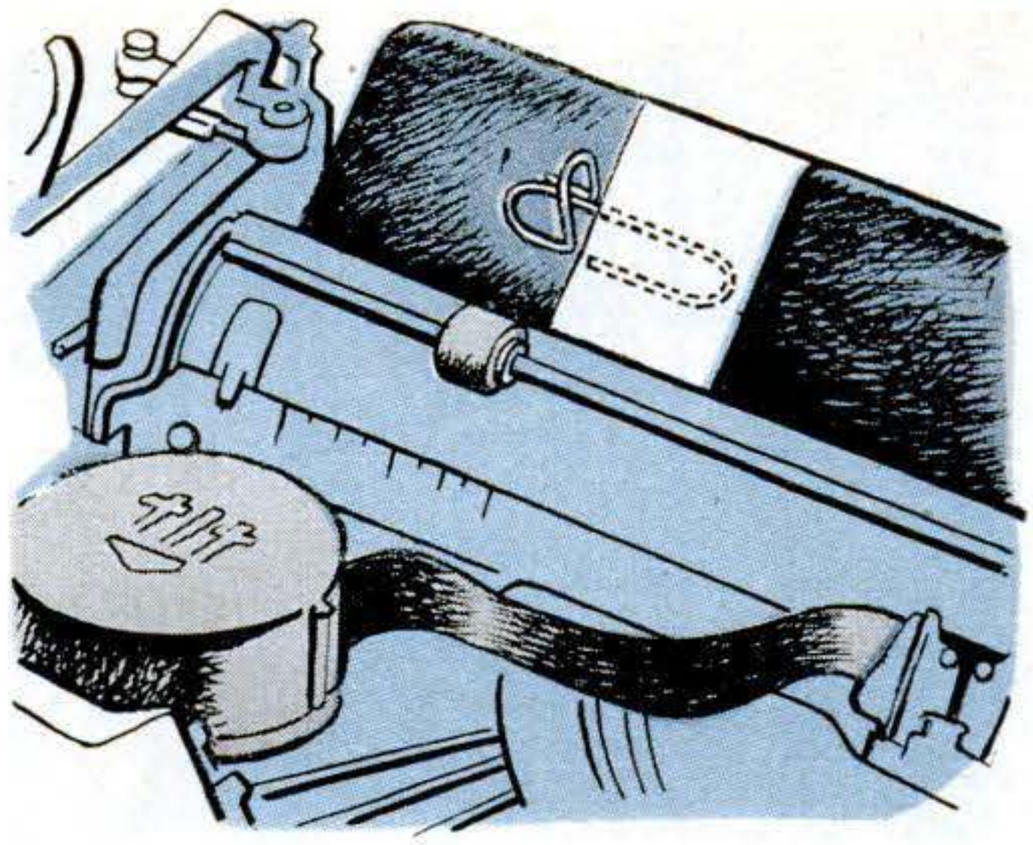


Wooden jig is shown at left; finished handle in center. Cut stock to shape shown at right.

Copyrighted material

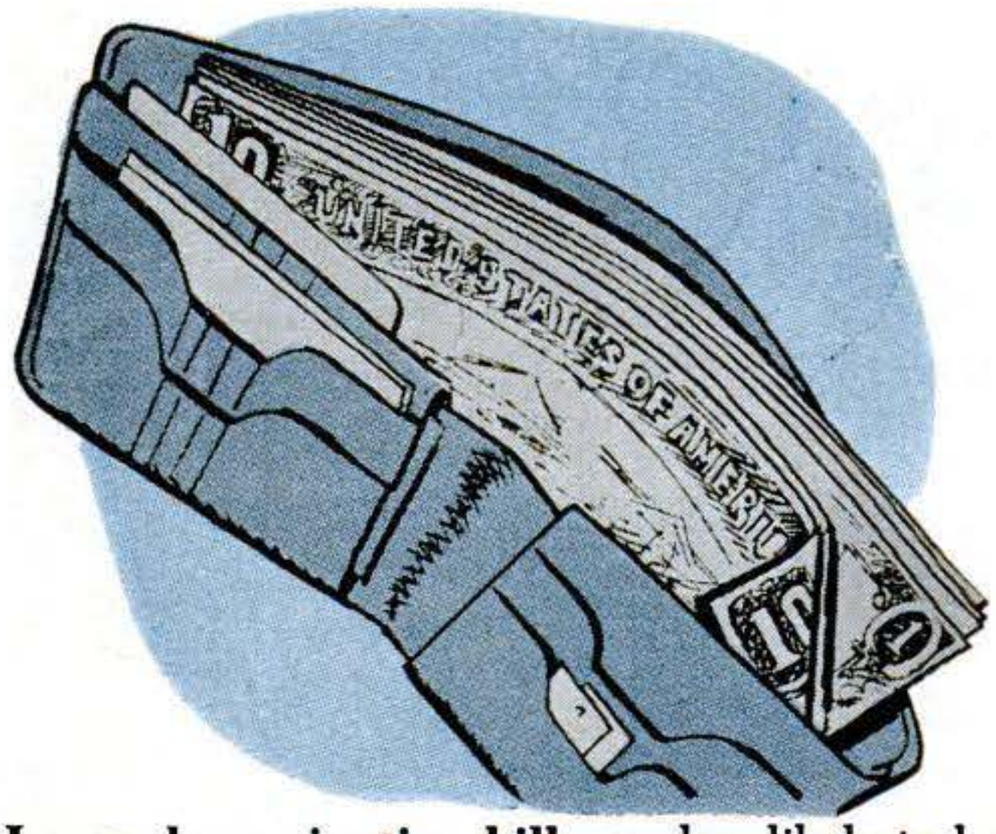
Keeping the Home Shipshape

Tin cans won't pile up in the kitchen rubbish container with this disposal system. Cut a 6″ hole in a cupboard floor and use a stovepipe to lead the cans to a cellar basket.

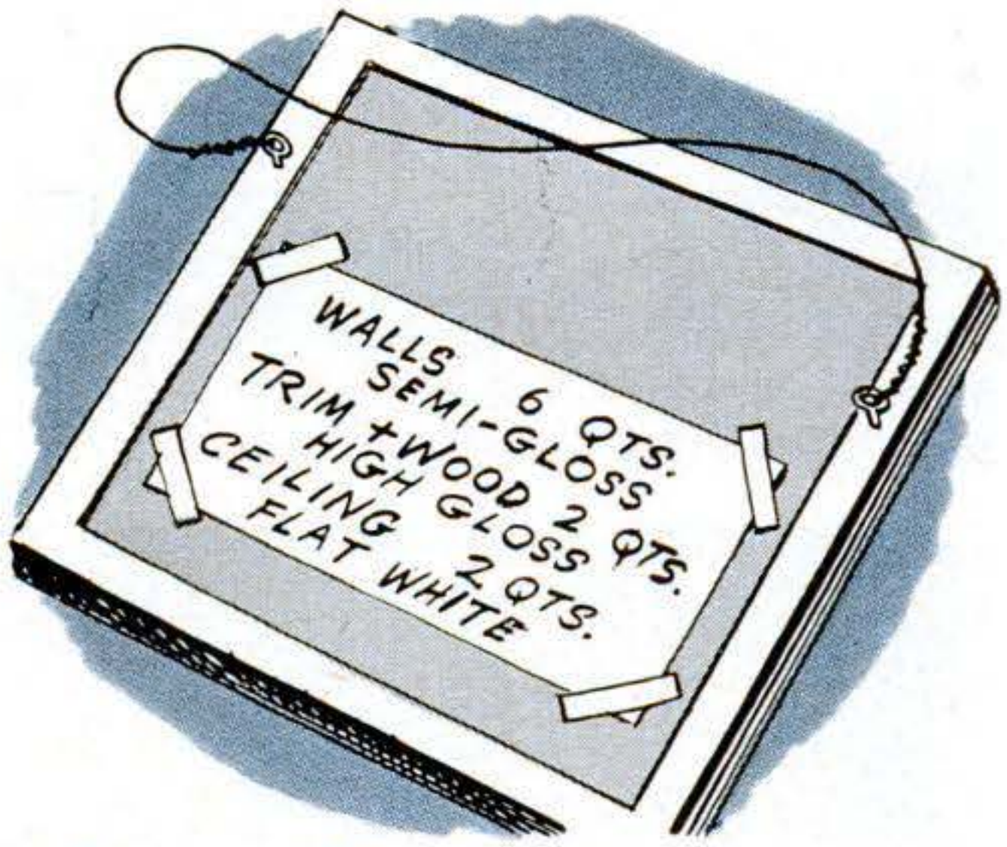


Typewriters that don't have lateral paper guides can be adapted for uniform paper setting by bending a wire clip as shown. Fasten the clip to the paper table with masking tape.

Luminous paint on door edges may prevent painful bumps, especially if anyone in the family leaves doors open at night. Apply bands of the paint to each door at about eye level.

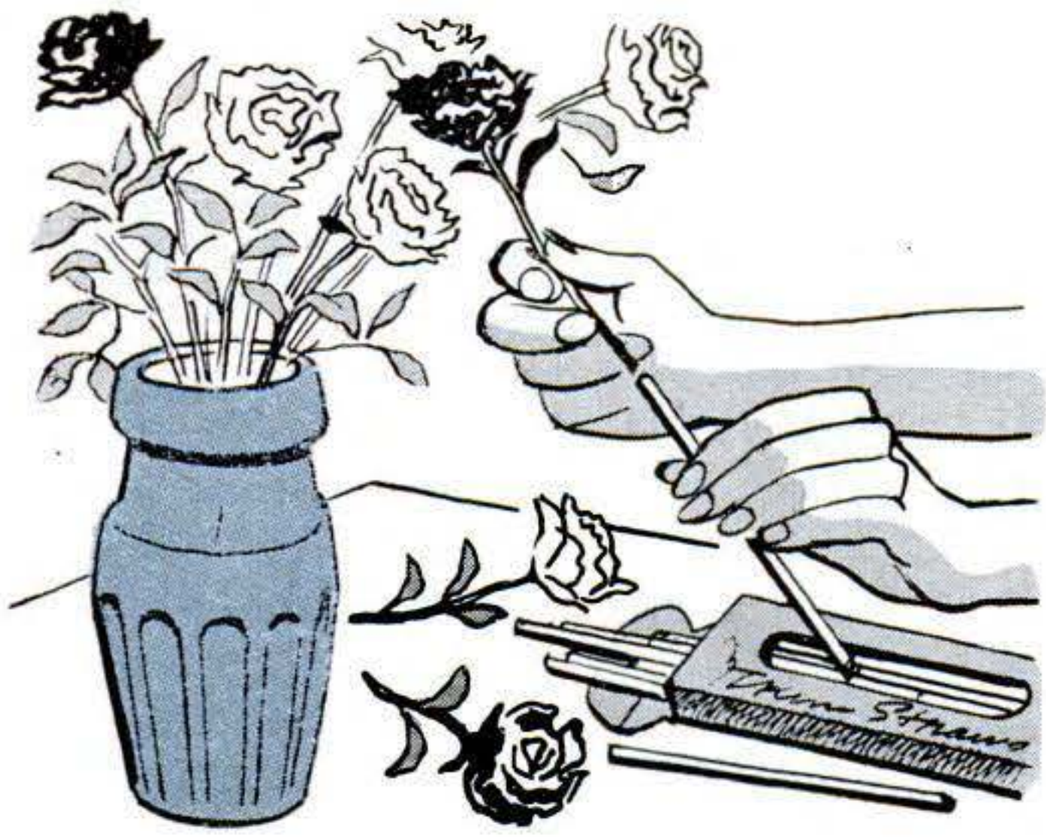


Large-denomination bills are less likely to be pulled out of a wallet and used by mistake if they are dog-eared at the corner to distinguish them by touch from smaller bills.

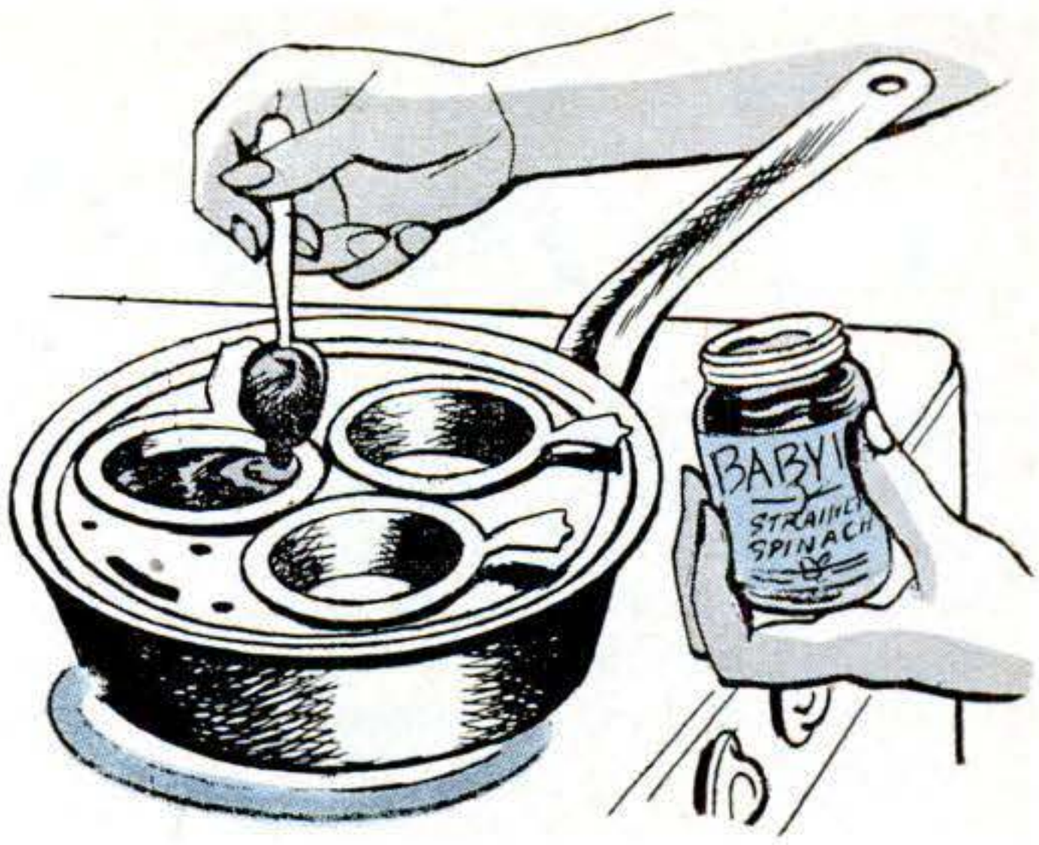


Jot down painting, wallpapering, or cleaning information on the back of a picture. Records of dates and quantities will help in planning purchases the next time you redecorate.

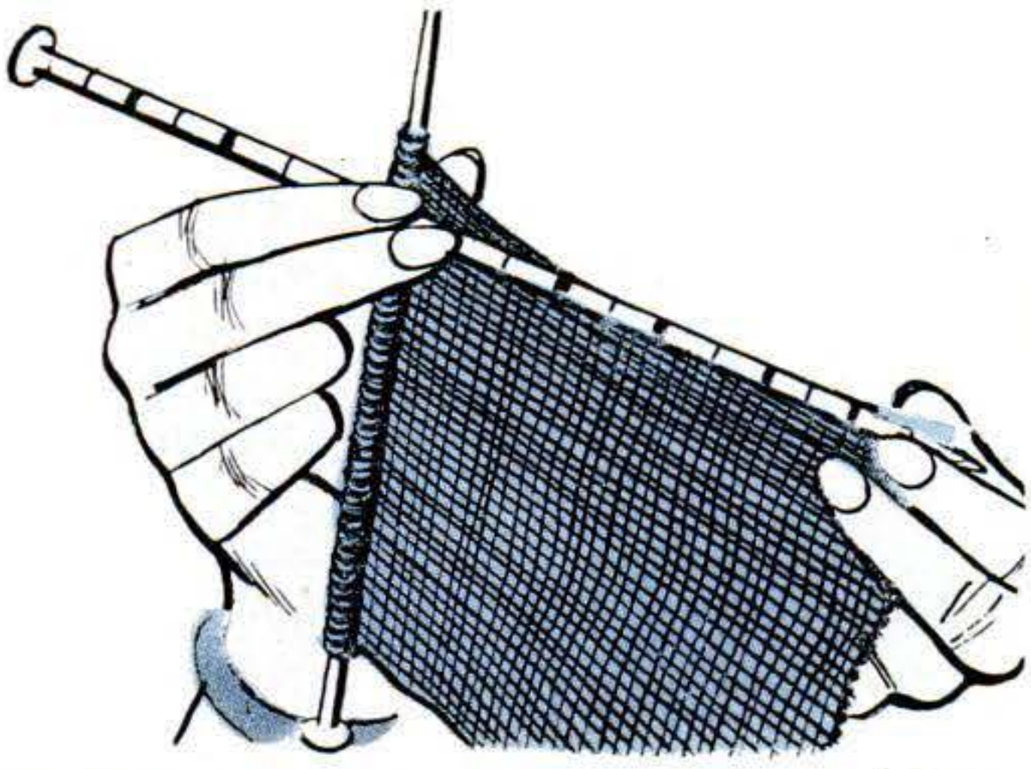
Copyrighted material



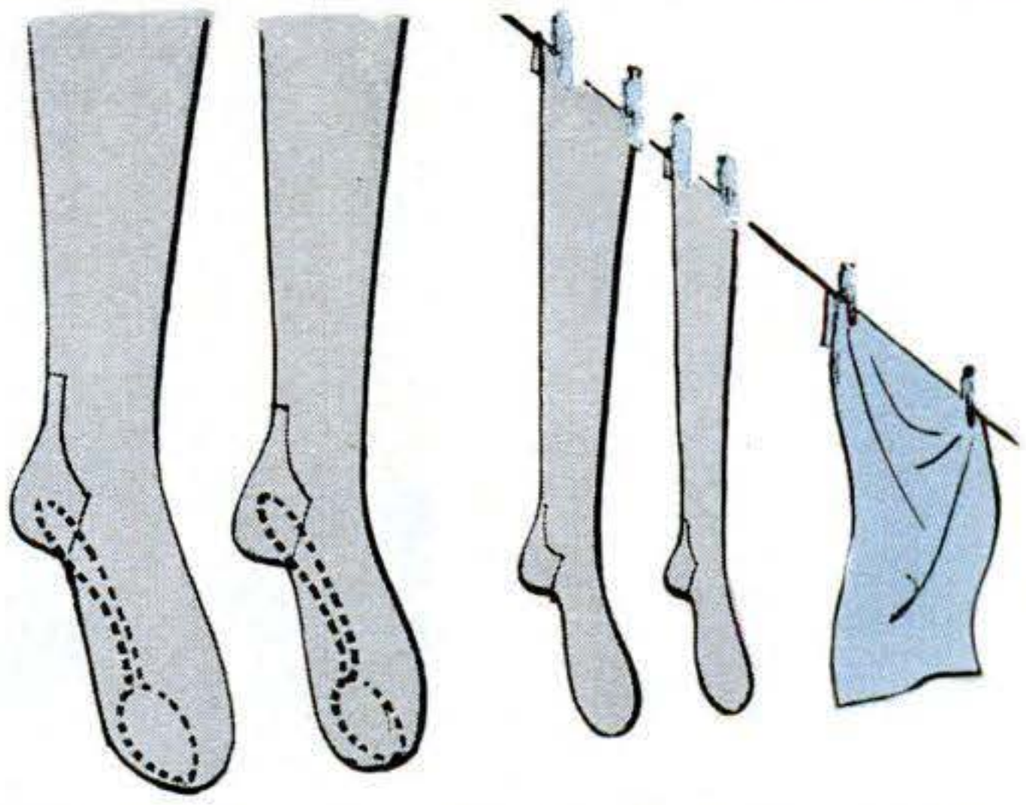
Short-stemmed flowers that defy graceful arrangement in vases can be lengthened by sticking the stems in drinking straws. Clear straws won't be seen in transparent vases.



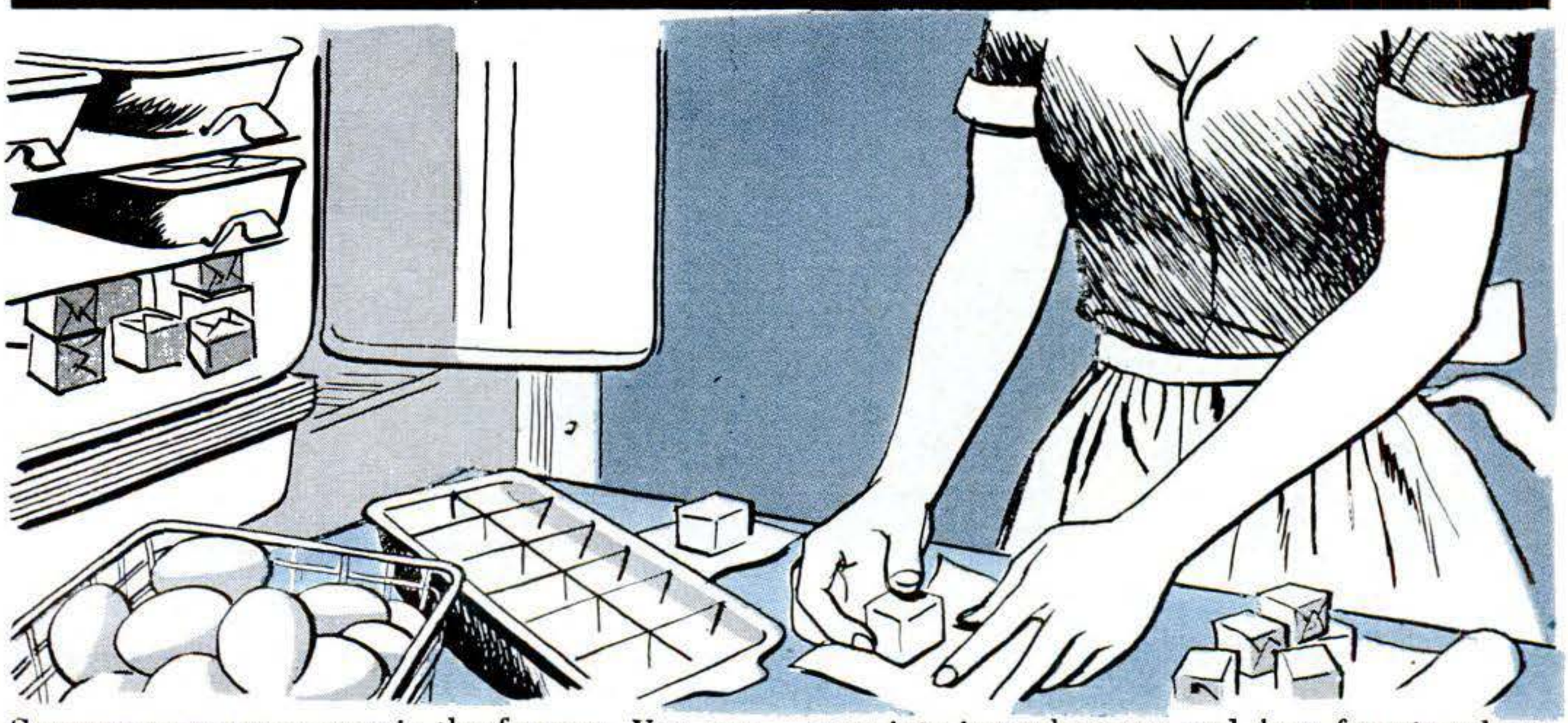
Different kinds of baby food can be heated at one time in a three-cup egg poacher. When the food has been warmed, lift it from the tray and feed the baby directly from the cup.



Marking knitting needles in inches and fractions allows the knitter to work to the desired depth without bothering with a tape or rule. Scribe the lines or use fingernail polish.



Drop a teaspoon into the foot of a stocking when you hang it out to dry. The spoon will keep sheer hose from whipping around the line, reducing the danger of runs or snags.



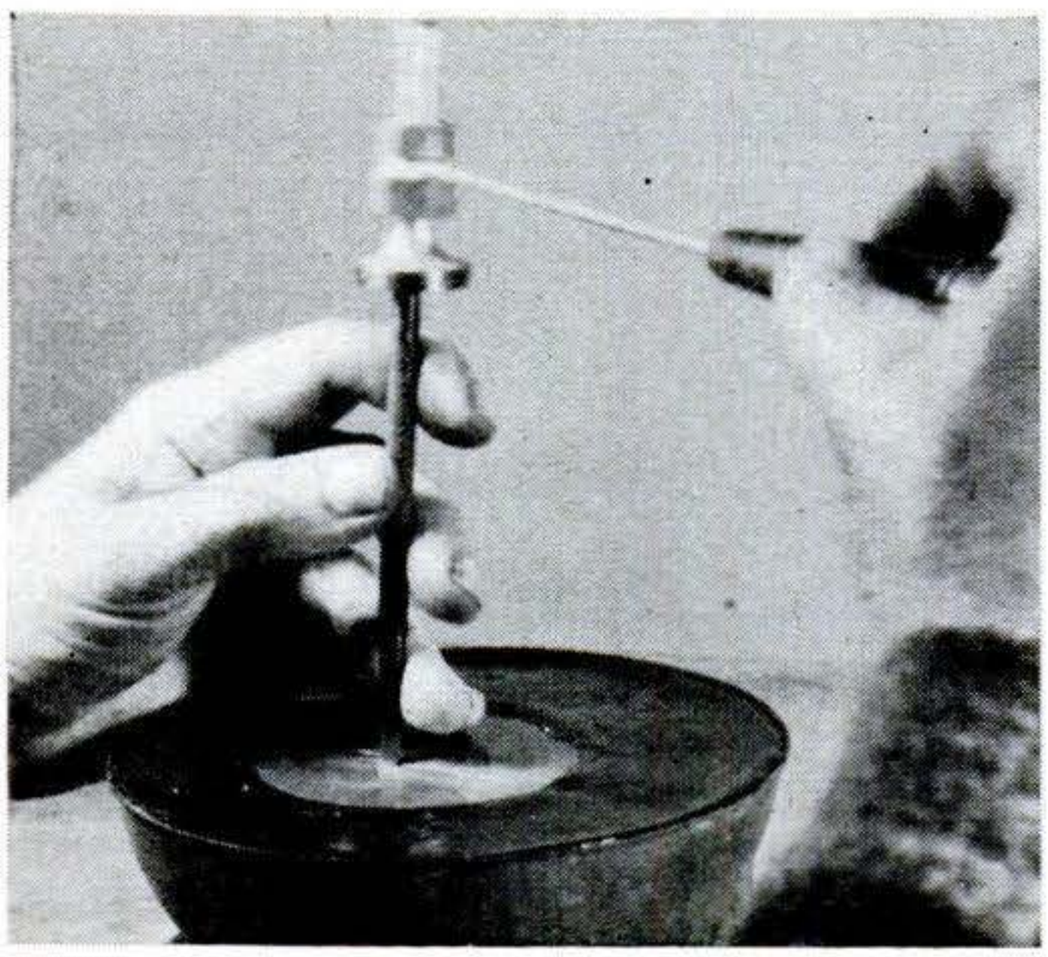
Square eggs save space in the freezer. You can improve on the hen's packaging by breaking eggs into ice-cube trays and deep-freezing them. When solid, wrap each one in waxed paper.

Copyrighted material

Car Valves Hammer Craftwork into Shape

PROFESSIONALS use broad-faced hammers with thin, springy handles for metal chasing. The work is done with a rapid-fire tapping that drives the chasing tool both along and into the metal. An ordinary light hammer won't do; the small face makes it too hard to hit the tool cleanly, and its rigid handle won't permit the fast stroke needed.

You can make these three chasing hammers from old engine valves. They're mounted on steel rods having wooden handles, and have proved quite satisfactory.



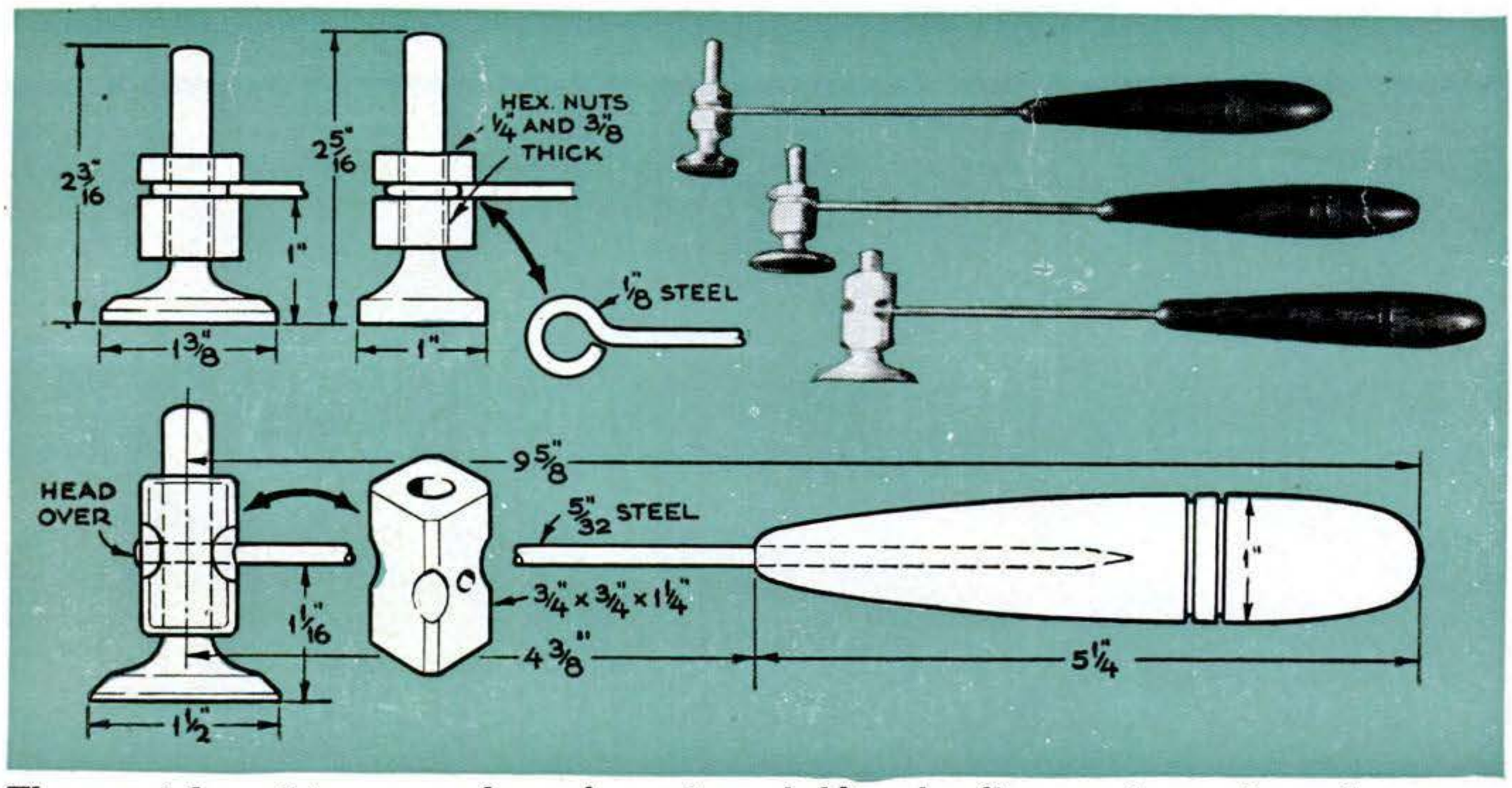
Hammer is held lightly, the handle pivoting in fingers. Hold chasing tool at 5-deg. angle.

Old valves can be had for the asking at many garages. If they have holes or slots in the head, fill these by welding or by silver-soldering in steel plugs. The head can be turned to diameter in a lathe with a tungsten-carbide bit or a tool-post grinder, or ground down on a valve refacing machine. The stem is simply cut to length and rounded off.

To secure the handle shafts, you can turn and bore a sleeve of mild steel to fit over the stem of the valve, drilling through this block and the valve stem for the handle. Peen over the end of the latter and flow soft solder all around.

You can instead heat the handle red hot and bend it around the valve stem into a loop, as shown for the two smaller hammers. Ream out two hex nuts to a snug fit on the valve, file everything bright, and weld, silver-solder, or sweat together with soft solder.

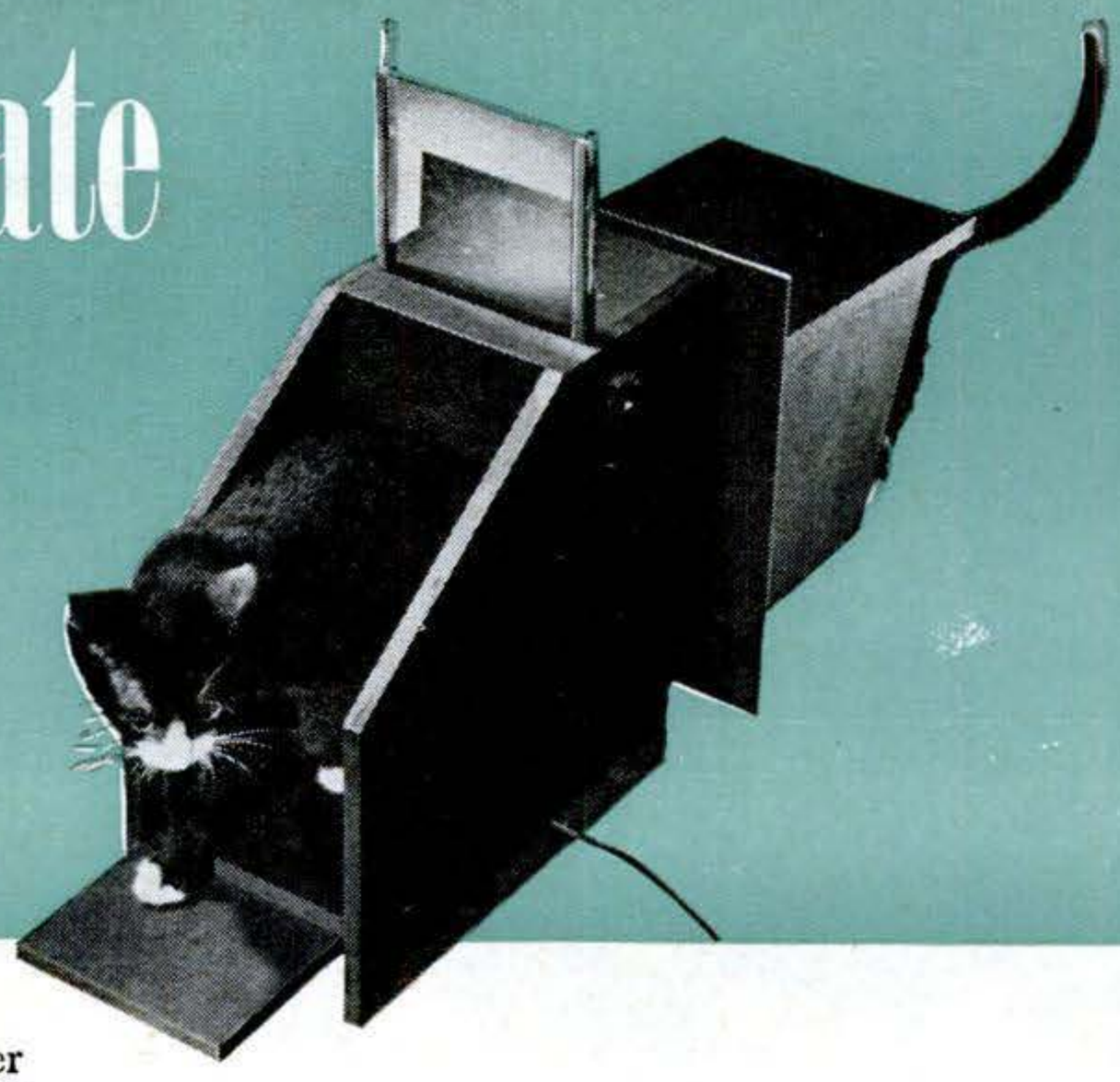
File the handle shaft on four sides to a square tapering point and drive it into an undersized hole in the wooden handle, which should be turned from maple, beech, or oak.—*Edward J. Thatcher, Woodstock, N. Y.*



Three weights of hammers do work ranging from jewelry to candle sconces. Two ways of holding handles are shown. Looped ones are locked between two nuts on stem of the valve.

Copyrighted material

Electric Gate Lets the Cat Out

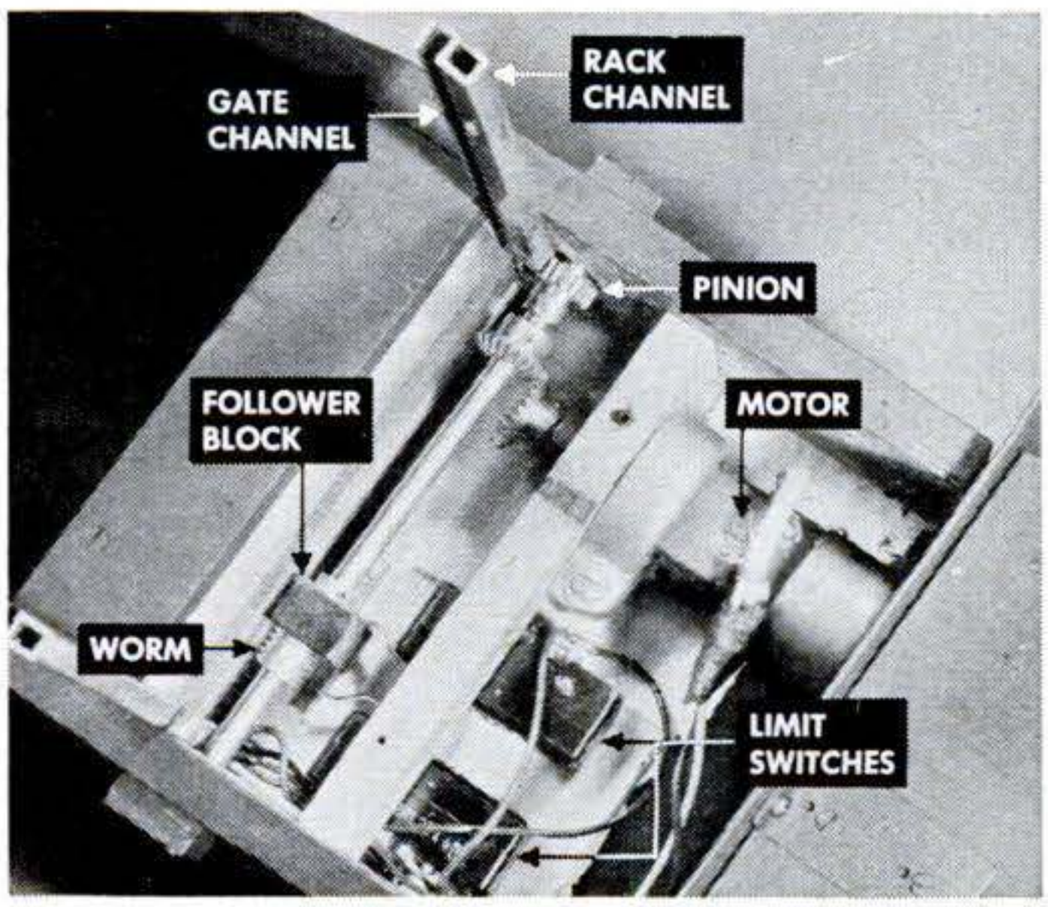


Did you put the cat out? The answer is no. She simply marches up to this gadget and lets herself out.

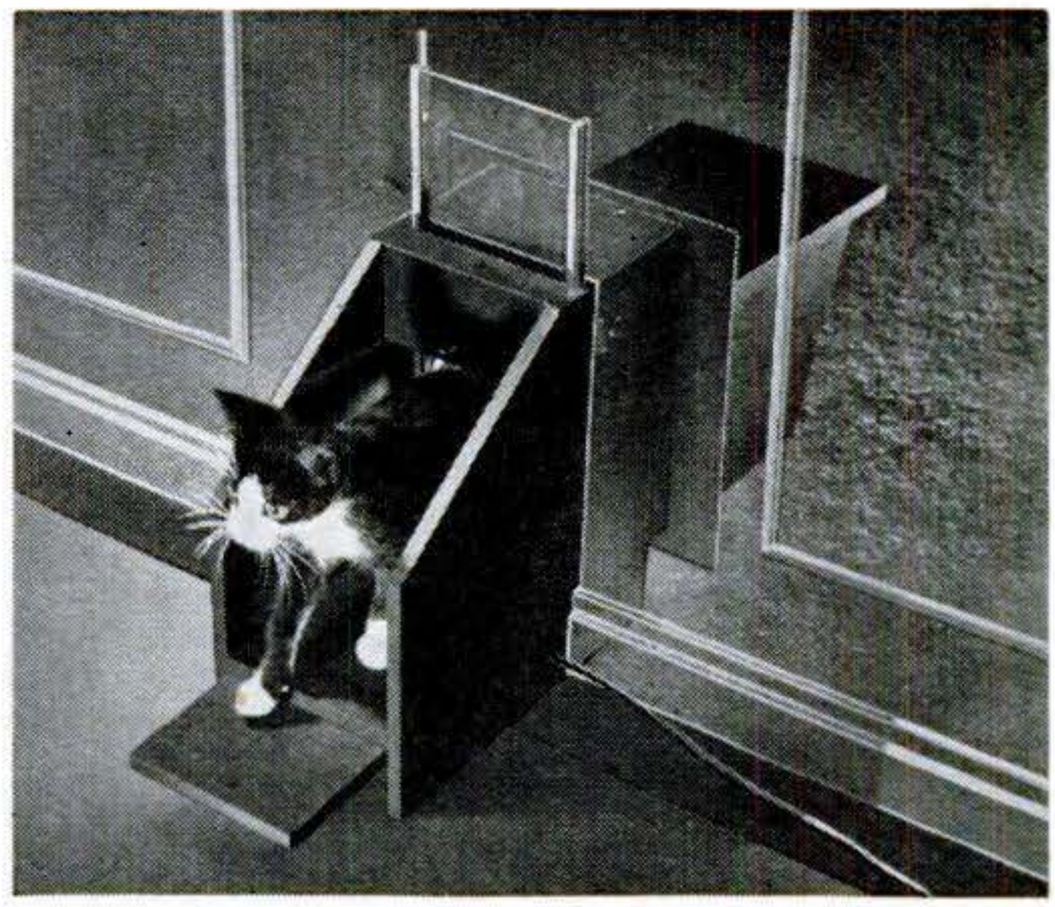
WHAT seems like one of the world's longer cats in the photo above is actually the beginning and end of two standard models. They are inspecting an electric cat-actuated door built by W. Griffin Paige, New York mechanical engineer. His product artfully compensates for cat behavior at doors, which is notoriously indecisive.

When a cat wants in or out, she simply marches up to the door. Her weight trips a sensitive switch (there's one under each ramp) and the door promptly rises. As long as she hesitates on either ramp the door stays open. When she steps off, a time-delay device takes over and shuts the door five seconds later. This gives protection if a hostile dog is loitering around the corner. If any malfunctioning should happen to close the door with a cat in transit, she still wouldn't be hurt. The light door fits loosely in a lifting frame and would just rest gently on her.

Teaching cats to use the gate was done in easy stages. At first it was installed with the door removed and the current off. After the cats had grown accustomed to it, the current was turned on. Then when they had become familiar with the motor sound, the door was put in.

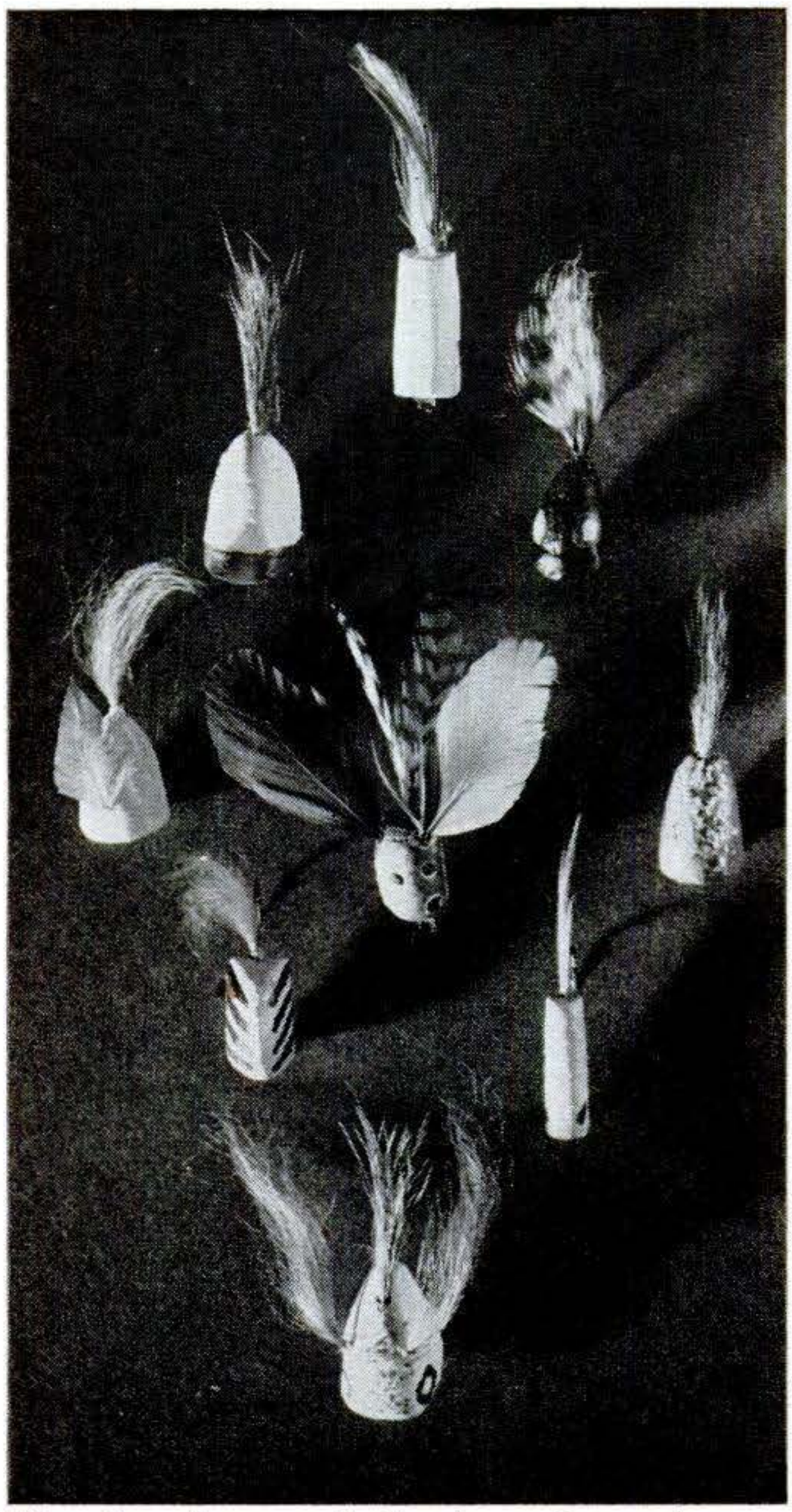


Elevating mechanism consists of a rack and pinion. Pinion shaft also carries worm on which a block slides to actuate limit switches that stop motor at each end of gate travel.



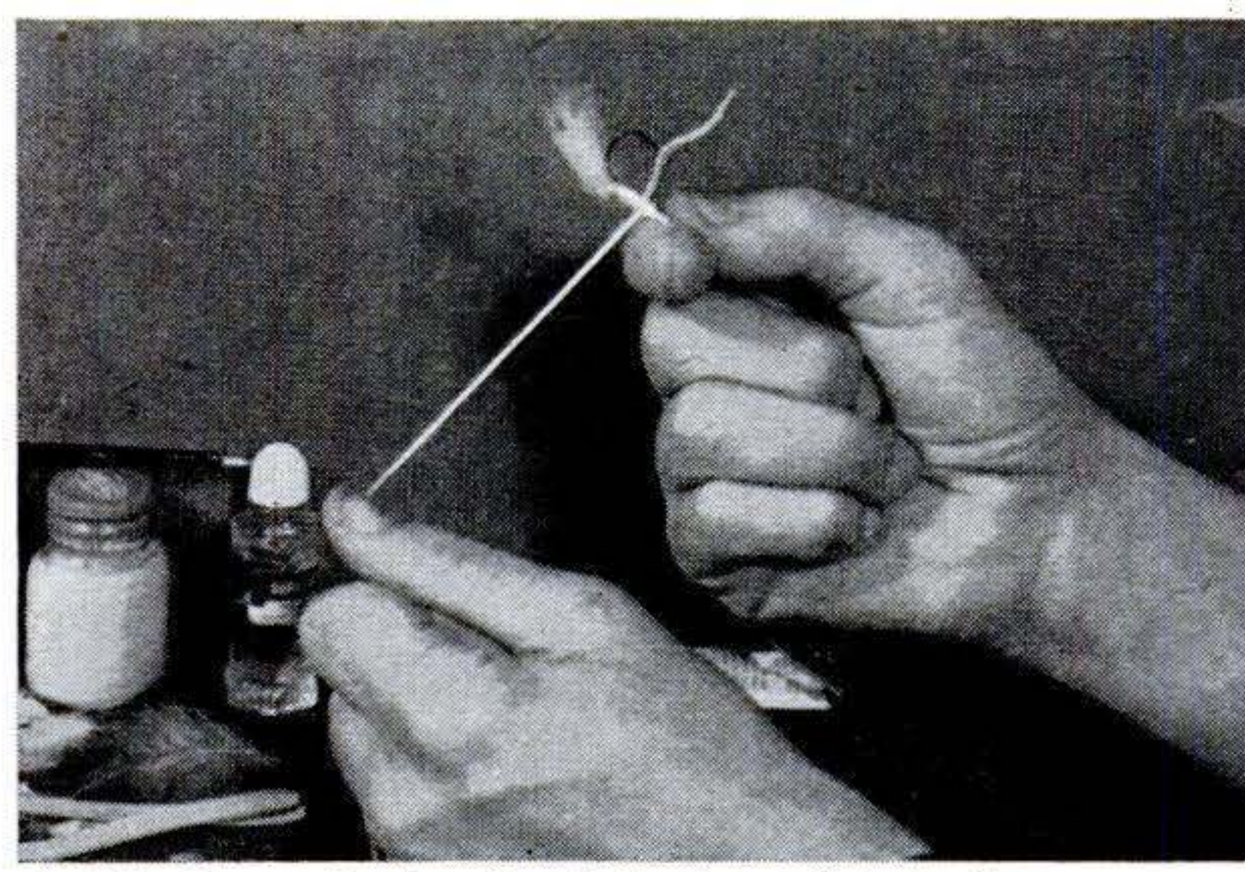
Out for a stroll and no one the wiser. Weight of cat closes switch that starts motor, raising the clear-plastic door panel. Door remains open as long as cat is on either ramp.

Copyrighted material



Nine bass bugs made by the author and guaranteed to lure even the most reluctant bass into striking. Requiring only simple materials and tools, these bugs cost about a cent apiece.

1. Start with a cork about 1" long and ⅝" in diameter. Shave a ¼" slice off one side to form the bottom. With careful strokes of the blade, shave the rear end down to a point.



4. Work on the hook while the polish is drying. Lay a pinch of bucktail along the shank of a No. 2 hook. Bind it evenly and tightly with several wrappings of strong thread.

Homemade Bugs Pull in the Bass

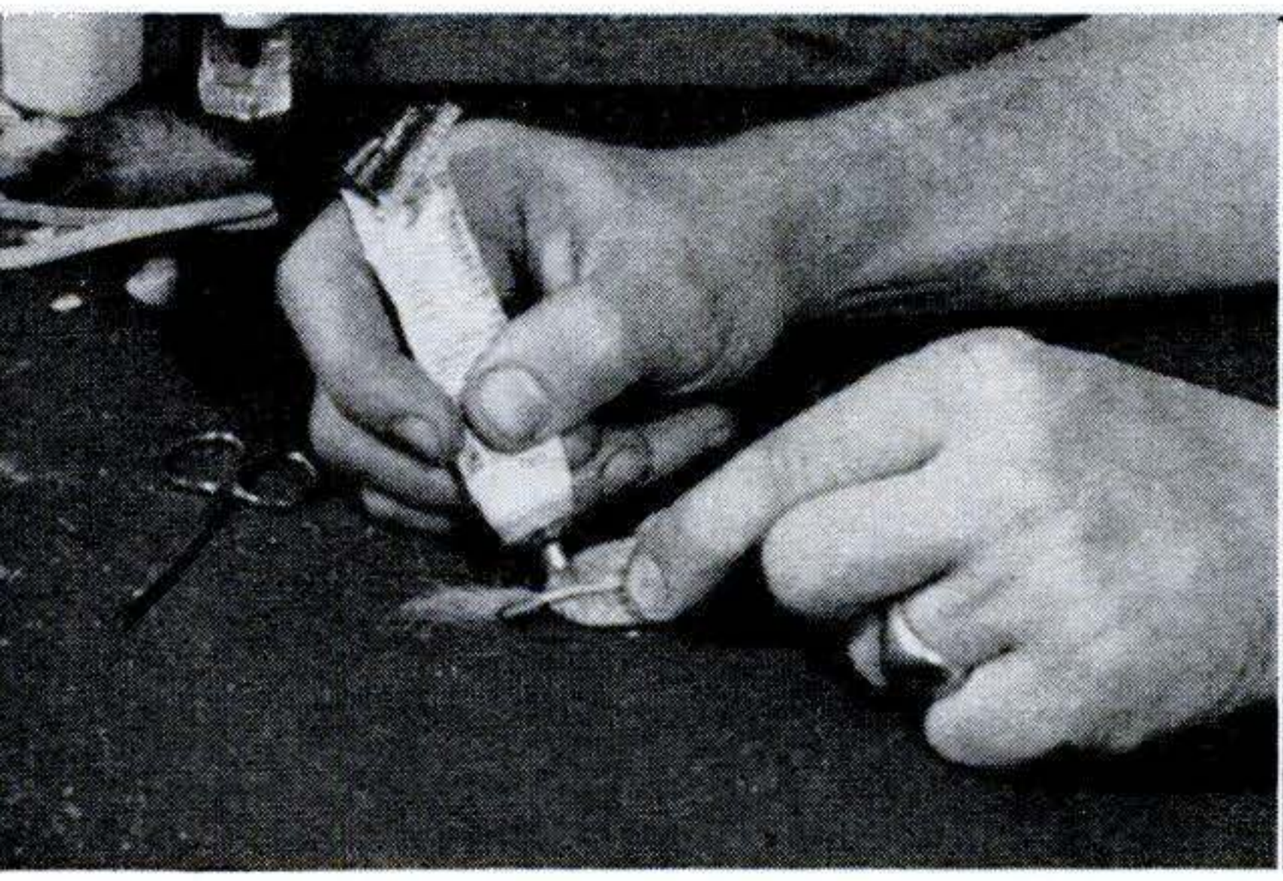
SUMMERTIME is fishing time, and any angler can double the thrill of slipping a net under a fighting bass if he's using a bug he made himself. What's more, the bugs you can whip up for about a cent each would probably cost 50 cents at most tackle shops.

Most of the supplies you'll need can be found right around the house: thread, razor blade, scissors, corks, clear fingernail polish, and a few emery boards. You'll also need hooks, several small bottles of model-plane dope, cement, and a small paint brush. Feathers and bucktail for wings and streamers may have to be bought at a tackle store. Start with a simple bug and, as your skill increases, you can begin to add wings and experiment with fancy new shapes.—*Thomas William Helm III, Birmingham, Ala.*

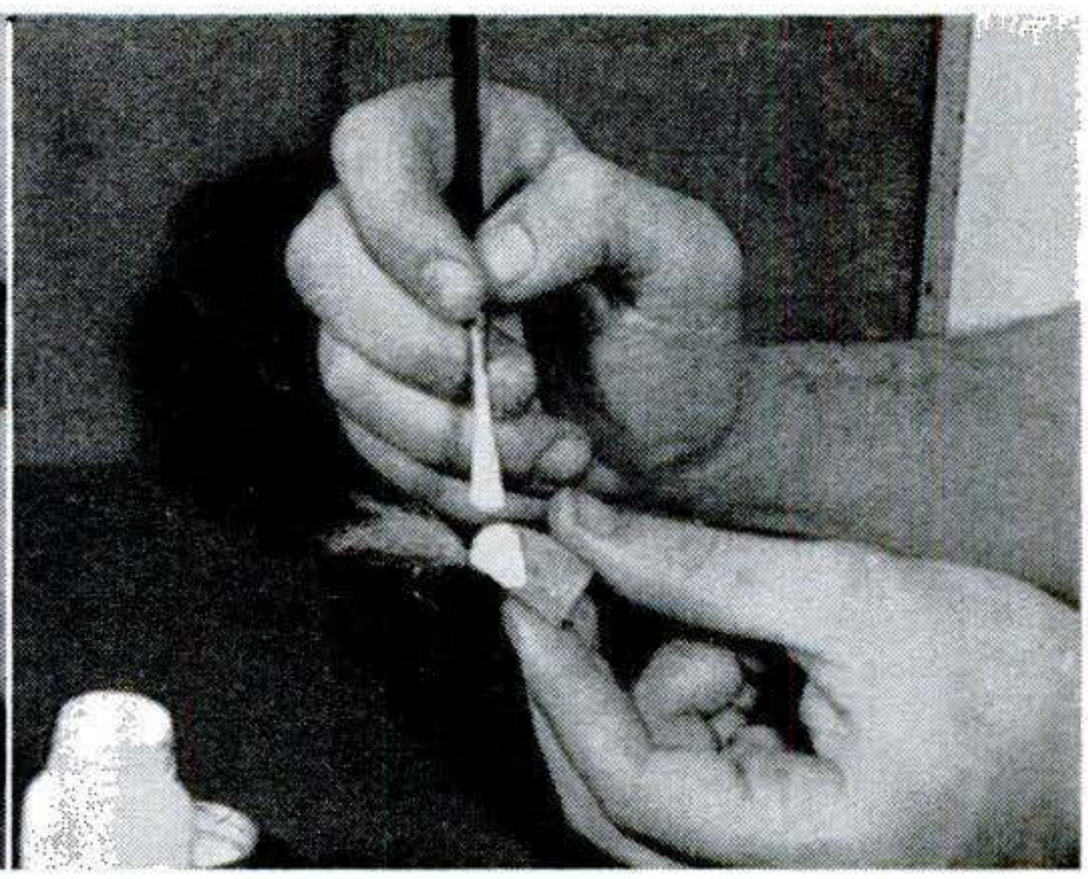
Copyrighted material

2. After the rough shape of the bug has been cut out, work with an emery board. The smoother you get the cork, the better it will take the coats of paint and polish that follow.

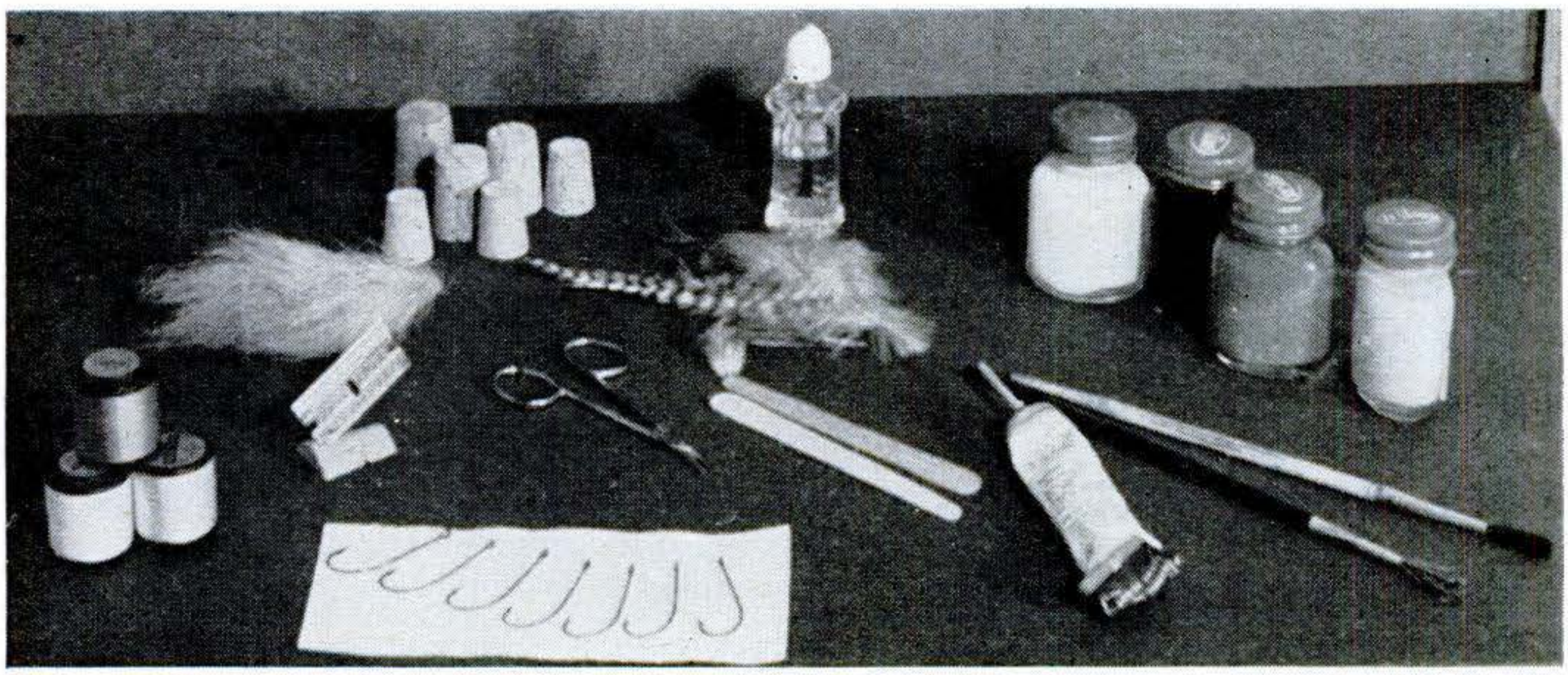
3. Using a knife as a handle for the cork, give the bug a heavy coat of clear fingernail polish. Work the lacquer well down into the tiny pores and grains in the cork.



5. Cut a slot ⅛" deep and ⅛" wide in the flat side of the cork. Fill the slot with waterproof cement and place the shank of the hook in it. Be sure the cement is waterproof.



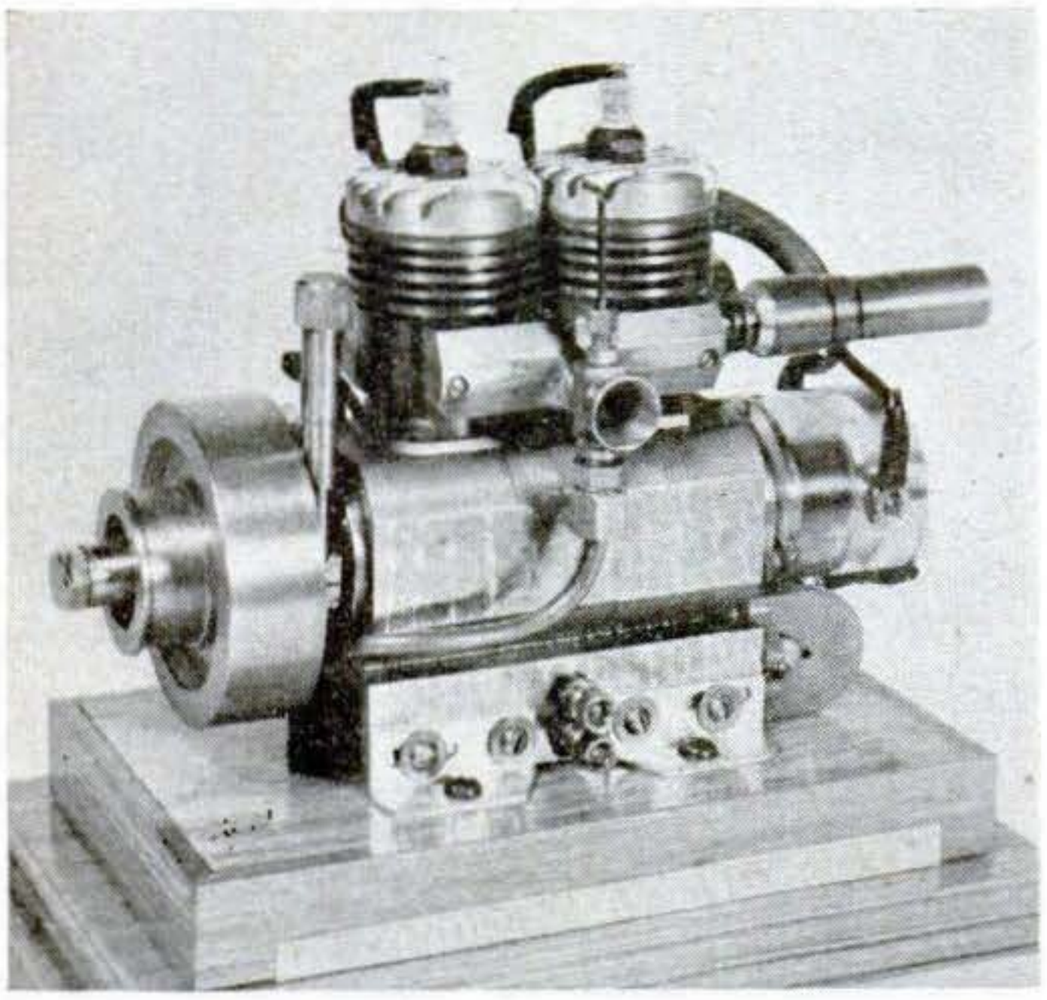
6. Before painting, rub down any rough spots in the polish with an emery board. Then give the bug two or three coats of fast-drying paint or dope. Let it dry thoroughly between coats.



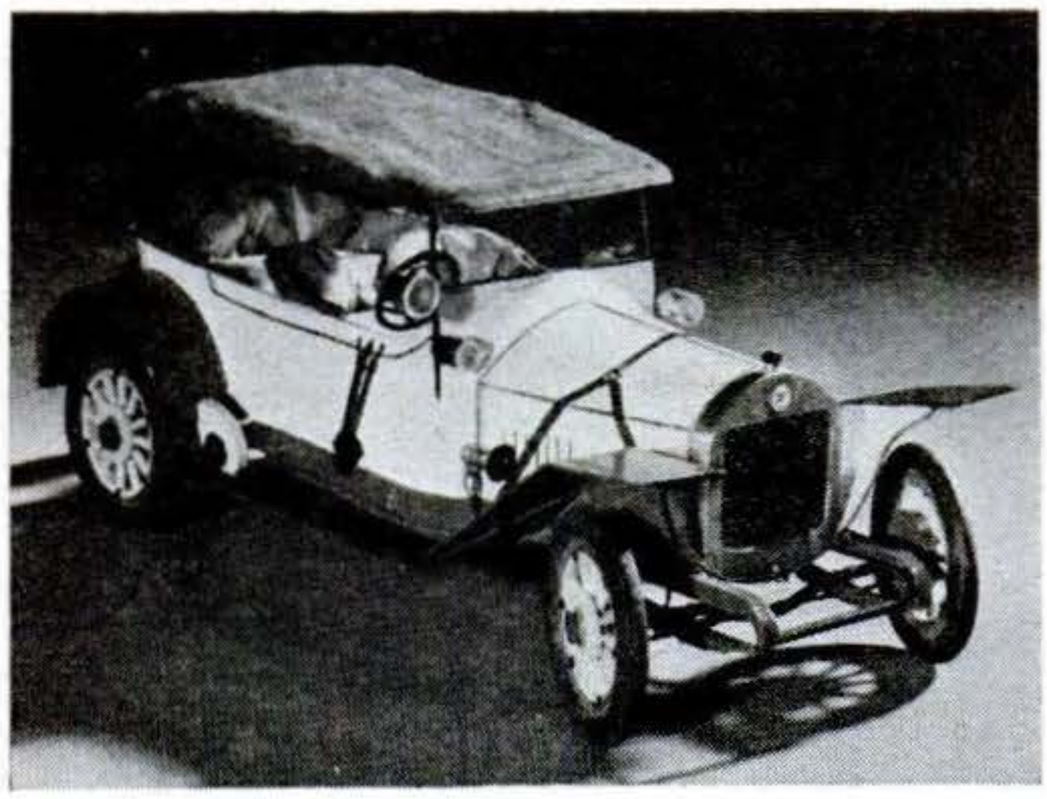
Here are all the supplies and tools you'll need to whip up a batch of your own bass bugs. Many of these items—scissors, corks, thread, and razor blades—can be found around your home.

Copyrighted material

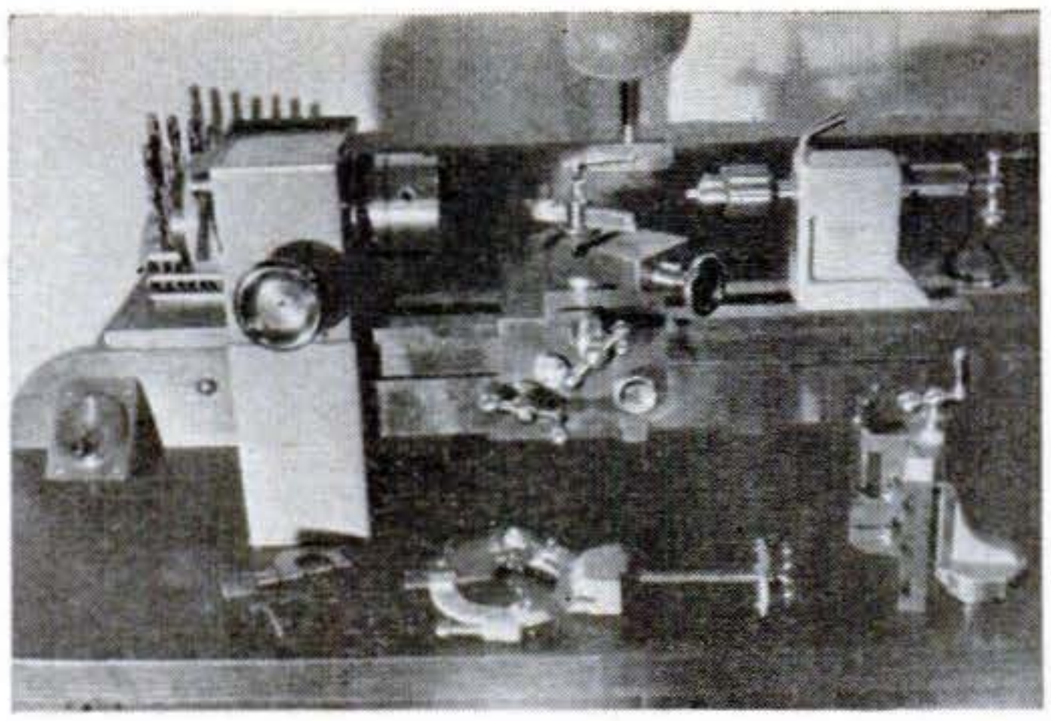
CRAFTSMEN AT WORK

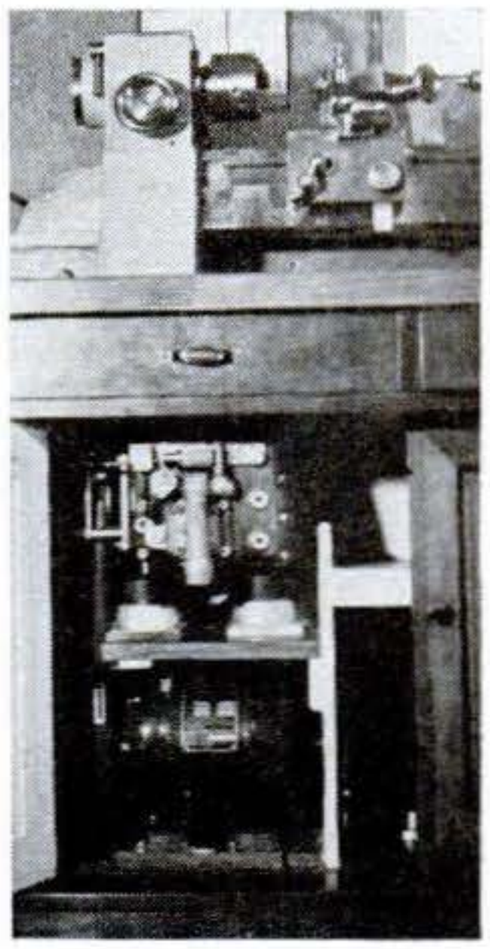


Alternate-Firing Twin. Developing an estimated 1 hp. at 7,500 r.p.m., this air-cooled two-cycle engine is only about 6½" long and 4½" high. It was built by Alton Dorfmeier, of Fresno, Calif. With the exception of a pair of rough castings for the pistons, he used nothing but scrap metal in constructing the basic engine. It has a counterbalanced crankshaft turned from one piece. Two power impulses per revolution deliver an unusually smooth power flow, its builder says, and it starts at the first pull of a cord wrapped around the flywheel hub. Total parts cost was about $13.

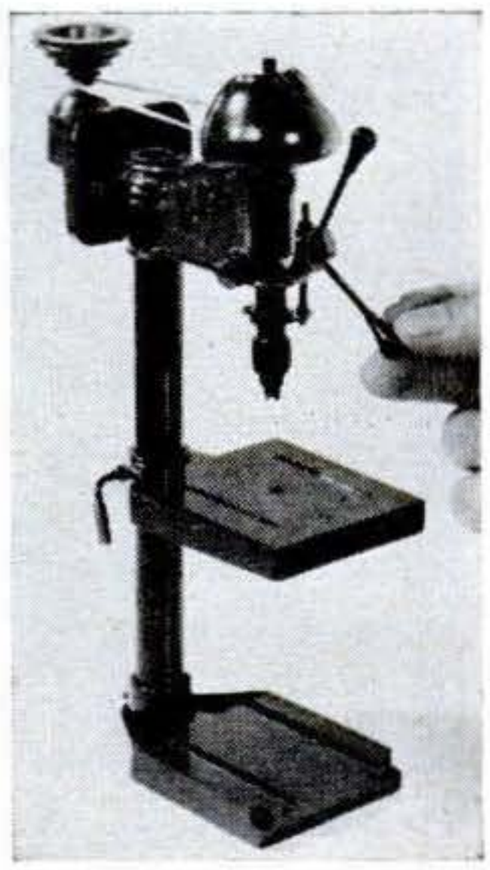


Isotta Fraschini Modeled. Scaled at ¾" to 1', this finely detailed mantel model of a 1914 Italian car was built by PS contributor Herbert Lozier, of Brooklyn, N. Y. The chassis is shim brass, the body cardboard, and the upholstery real leather.





Precision Job. Norman EnHolm, a mechanical engineer of Lake Mahopac, N. Y., devoted three years' spare time to building this bench lathe. The distance between centers is 13" and the swing is 6⅝". EnHolm reports that the parallelism between spindle and bed is within .0003" in 13". The bed was built of two pieces of steel, heat-treated, aged, machined, rough-ground, assembled, and precision-ground to a mirror finish. The spindle, machined from tool steel, runs in large, taper roller bearings, driven by spiral gears from a jackshaft. The compound rest can be replaced with a milling attachment. A hydraulic transmission, controlled by a dial at the left of the bench, gives spindle speeds from zero to 1,100 r.p.m. in either direction. This was originally a gun-turret control mechanism.



Plastic Press. Standing less than 10" high, this working model of a drill press is made almost entirely of black Lucite®. It took John Dumas, Manhattan, N. Y., more than 200 hours to build it. Six splines on the spindle are milled to a depth of .037". A midget electric motor operates it through step pulleys.

Copyrighted material

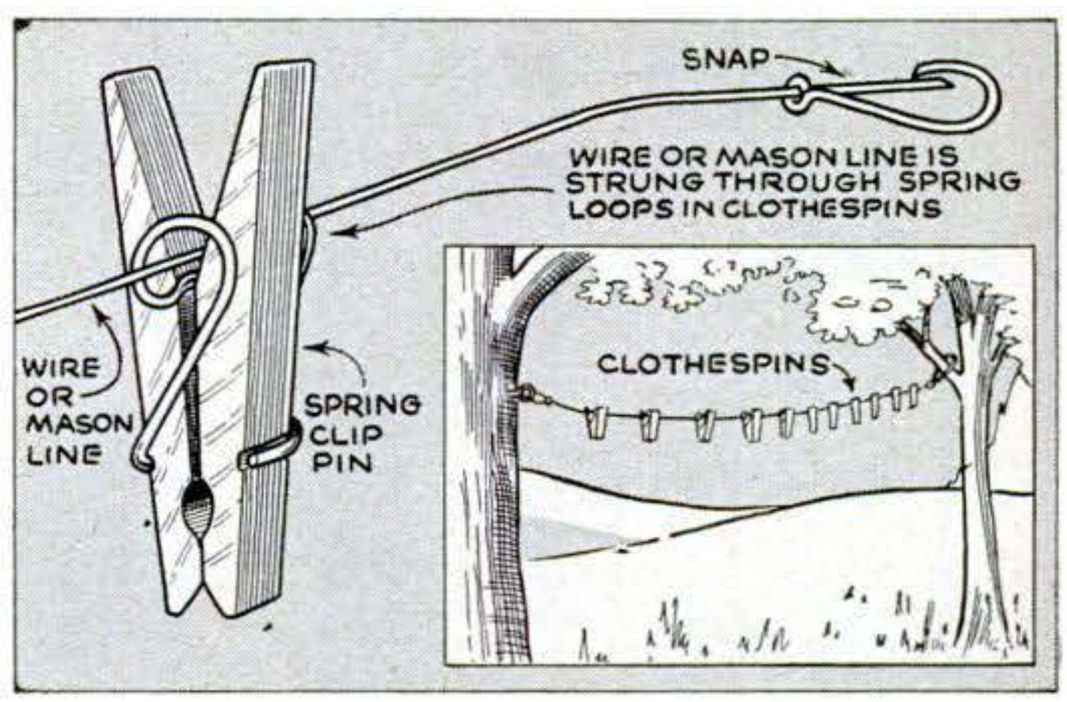
Silhouette Makes Night Light

In a child's room or hallway this silhouette-shaded night light is both unusual and useful. It's a low-cost, kitchen-table project, since it is made with cardboard and glue.

Laminate two or three sheets of heavy cardboard or showcard stock with glue. Cover one side with black paper and the other with gray paper; the latter is to serve as the back of the lamp. Trace the outline of the design you select on it. Cut it out with a sharp knife or a coping saw.

Build up the oval base of laminated cardboard. Cover the edges with a strip of black paper, or brush on India ink. Glue the silhouette to the base and fit thick cardboard braces at the back. Apply generous dabs of the glue for strength. Use a 7½-watt frosted bulb and a candelabra-size Christmas-tree socket. Mount the socket in one of the braces, as shown in the photo at right. With this mounting in a regulation socket there is no danger of fire, since the bulb generates very little heat. To be most effective, the lamp should be placed at, or a little above, eye level and about 1′ from a wall.

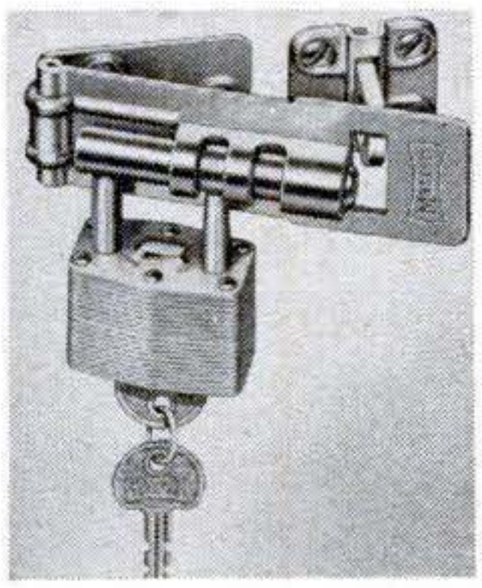
Camp Clothesline Snaps On



Aerial wire, snap links, and screw eyes form a camper's clothesline that's easy to put up and take down. String the wire through clip-type clothespins and wire the links to each end. Twist the screw eyes into a couple of handy trees and the line is ready to use. If the trees or limbs are located right, you may not need the screw eyes. Simply loop the wire around a limb and snap the link on the wire.—*John Krill, Youngstown, O.*

Lock Combined with Hasp

A laminated padlock, safety hasp, and sliding bolt all are combined in this unit manufactured by the Master Lock Company, of Milwaukee, Wis. Attached permanently to the bolt, the padlock swings freely to permit use of the unit on either right or left doors. Other features include a pinless hinge for extra security and reinforced and recessed screwhead seatings. The lock is priced at $1.25.

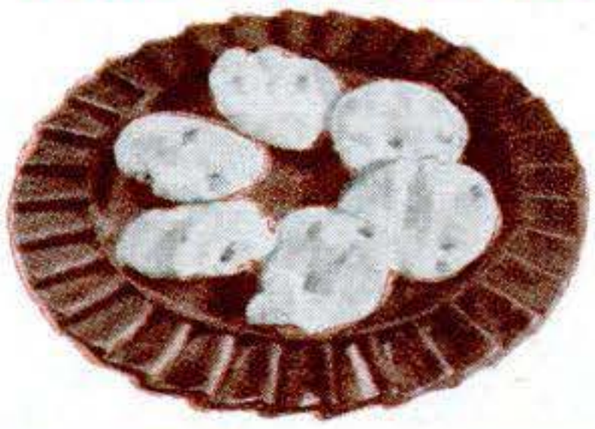


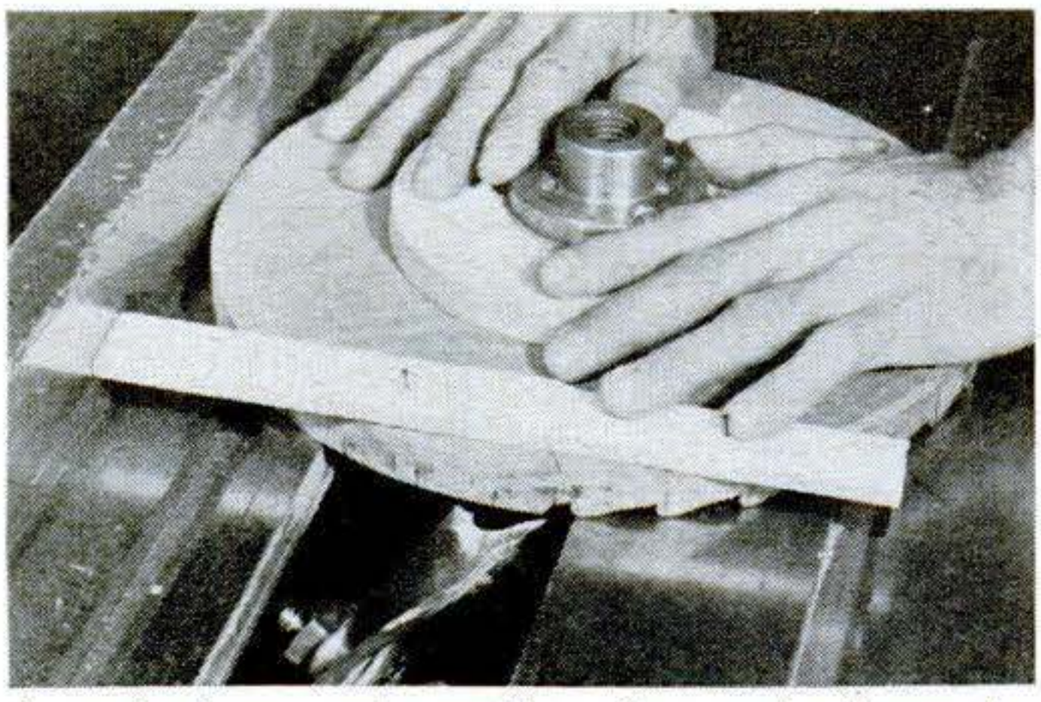
Rack Holds Drawing Pens

All your drawing pens are always visible for quick selection and use in this rack. The base is ¾″ by 2½″ by 10″. Use a circular saw to cut three 3/16″ by ⅜″ grooves at a 20-deg. angle. I glued strips of corrugated cardboard in the grooves to hold the pens upright.—*Glenn A. Wagner, Delmar, N. Y.*

Copyrighted material

Turned Tray Has Ruffled Rim





A tacked-on strip guides the work along the fence. Align the cutter with center of disk.

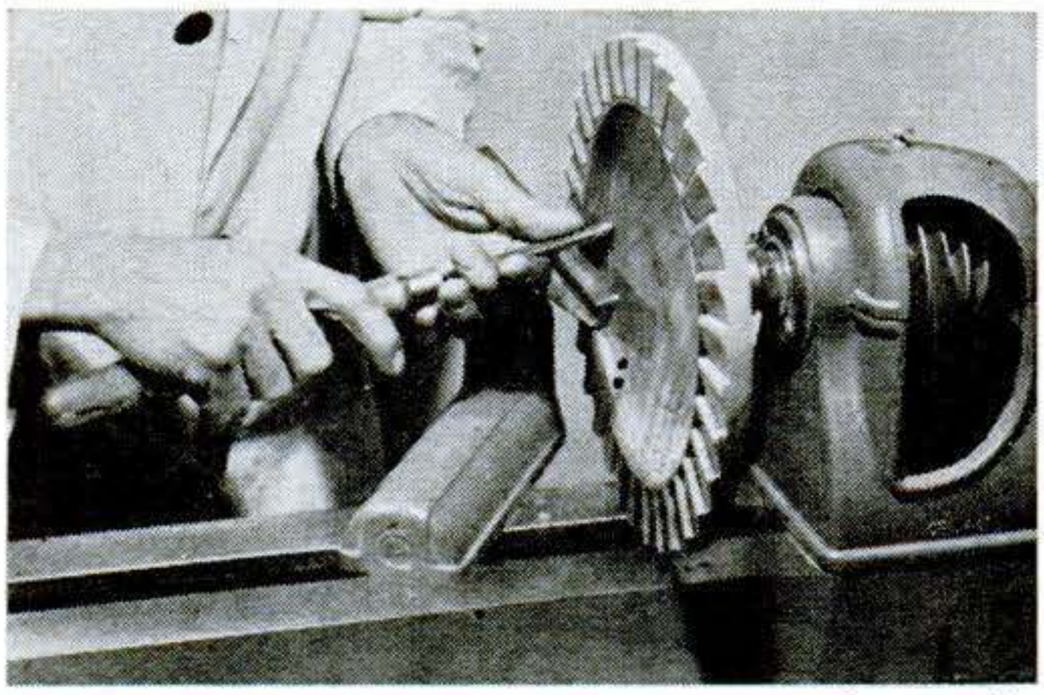
RADIAL molding, which gives a ruffled rim, puts this tray in the "one of a kind" class. The ruffles are shaped on a circular saw with a homemade cutter.

Mount a 1″ by 12″ turning blank (I used walnut) on the lathe faceplate, face true, and turn the edge true. Glue a piece of waste to this face, and remount with the faceplate screws in the waste. True the other face; then unscrew the faceplate from the spindle to form the ruffled edge.

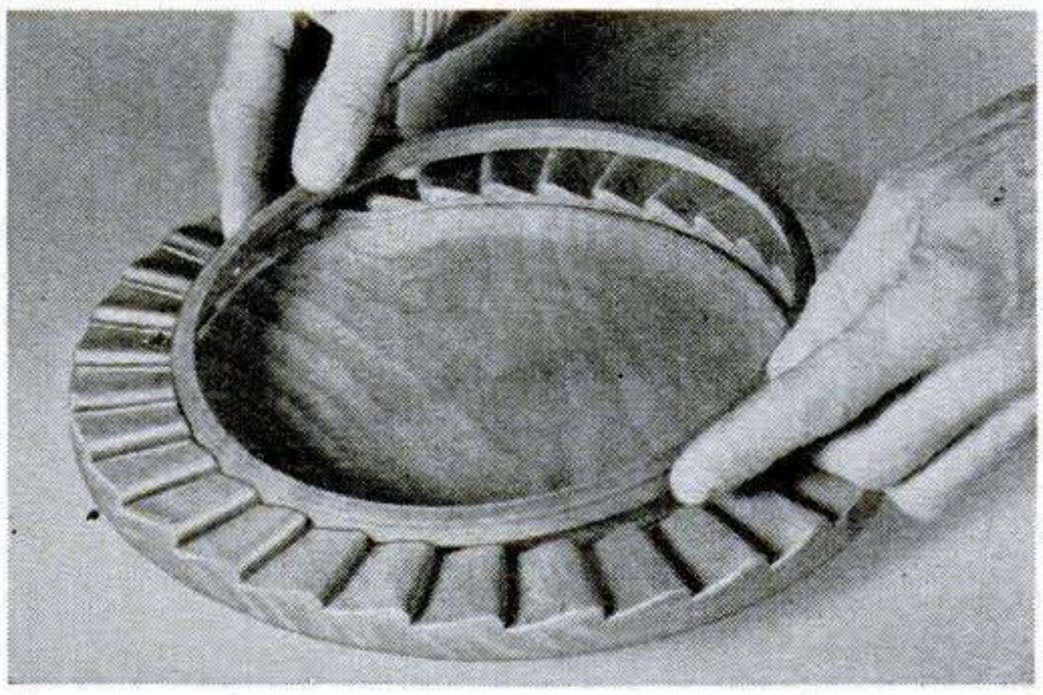
For this you can make a cutter from a piece of ¼″ carbon steel. Twist one end 90 deg. (you may have to heat it) and drill a hole to fit your saw arbor in the long shank. File the profile at a bevel to form a cutting edge, heat red hot, quench, and temper.

Tilt your saw arbor or table to 45 deg. and try the cutter on waste to determine the width of the ruffle it forms. Mark the disk edge accordingly into uniform spaces. Tack on a guide strip with a witness mark and align with the edge marks for each pass.

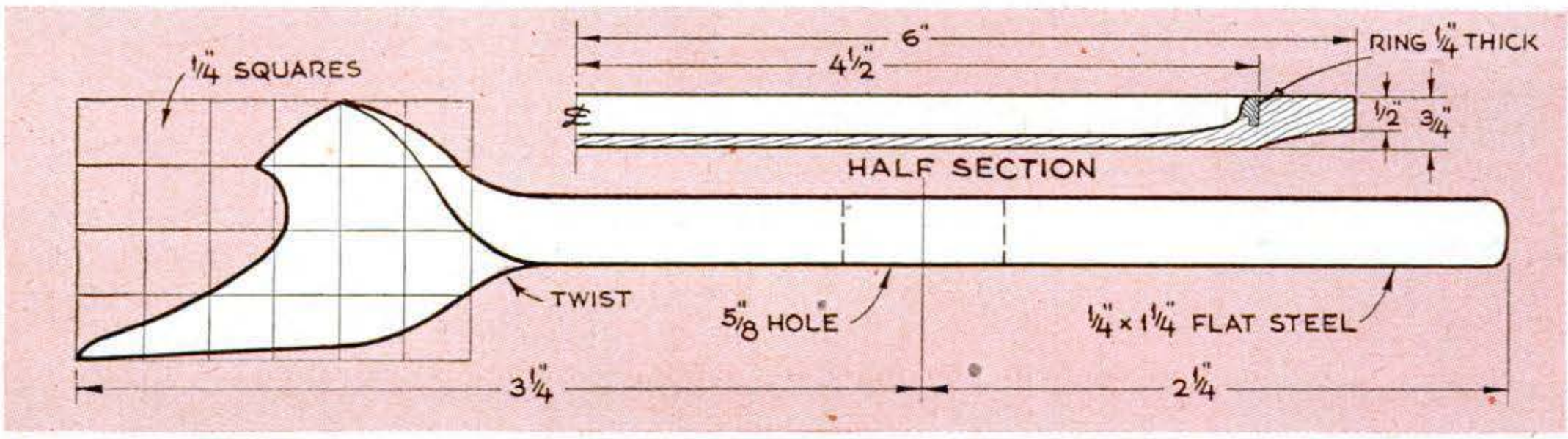
Remount on the lathe and turn out the inside. I turned a groove and fitted a ring into it, but you can instead turn a simple cove. Sand and part from the waste. Sand the ruffles by hand or with a brush-backed rotary sander. Finish with shellac, varnish, or wax.—*Benjamin Nielsen, Aurora, Neb.*



Remount on the lathe to turn out the inside after ruffles are formed. Sand the turned part.

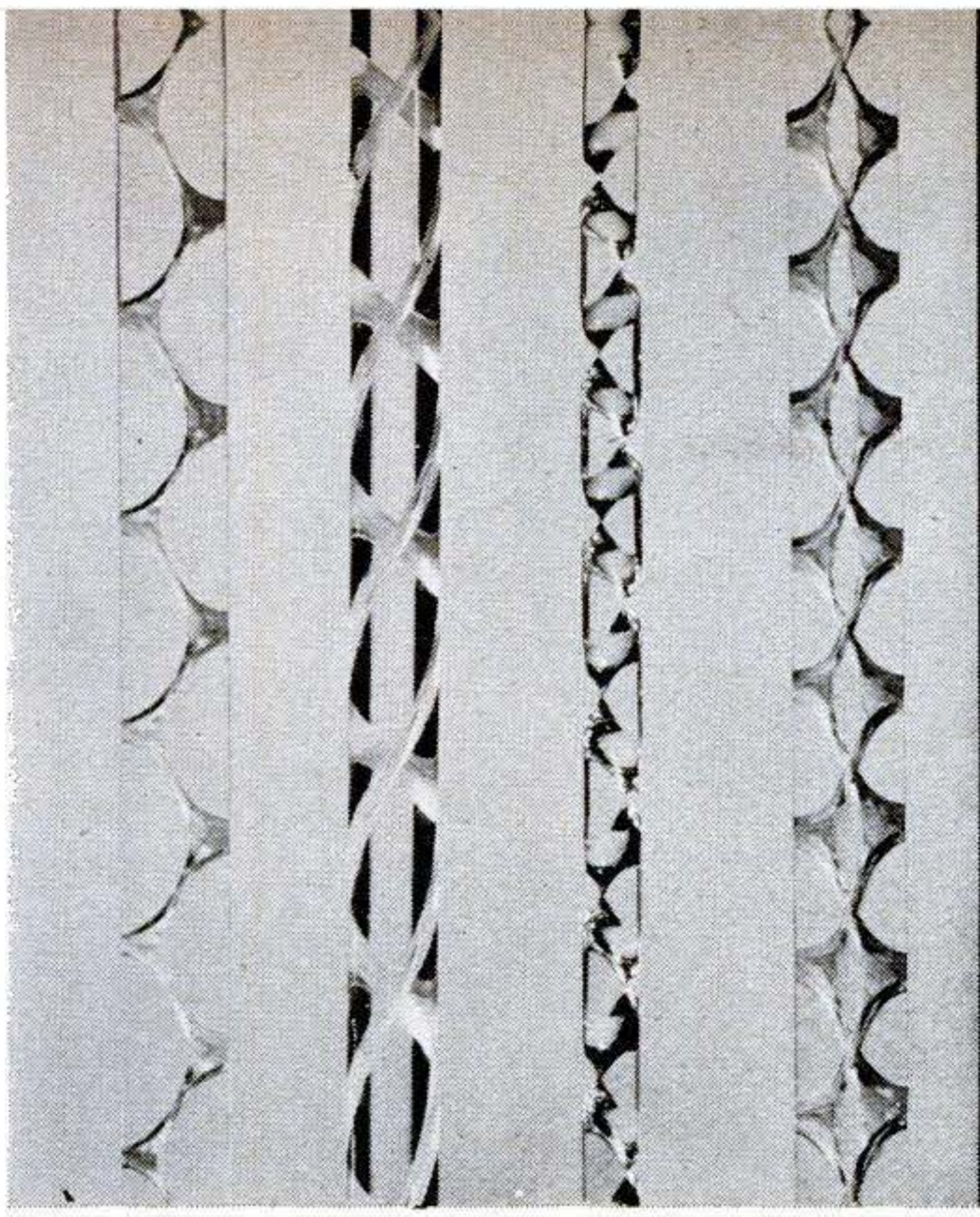


Ring is glued into groove. It can be omitted if you prefer to turn a plain cove up to the rim.

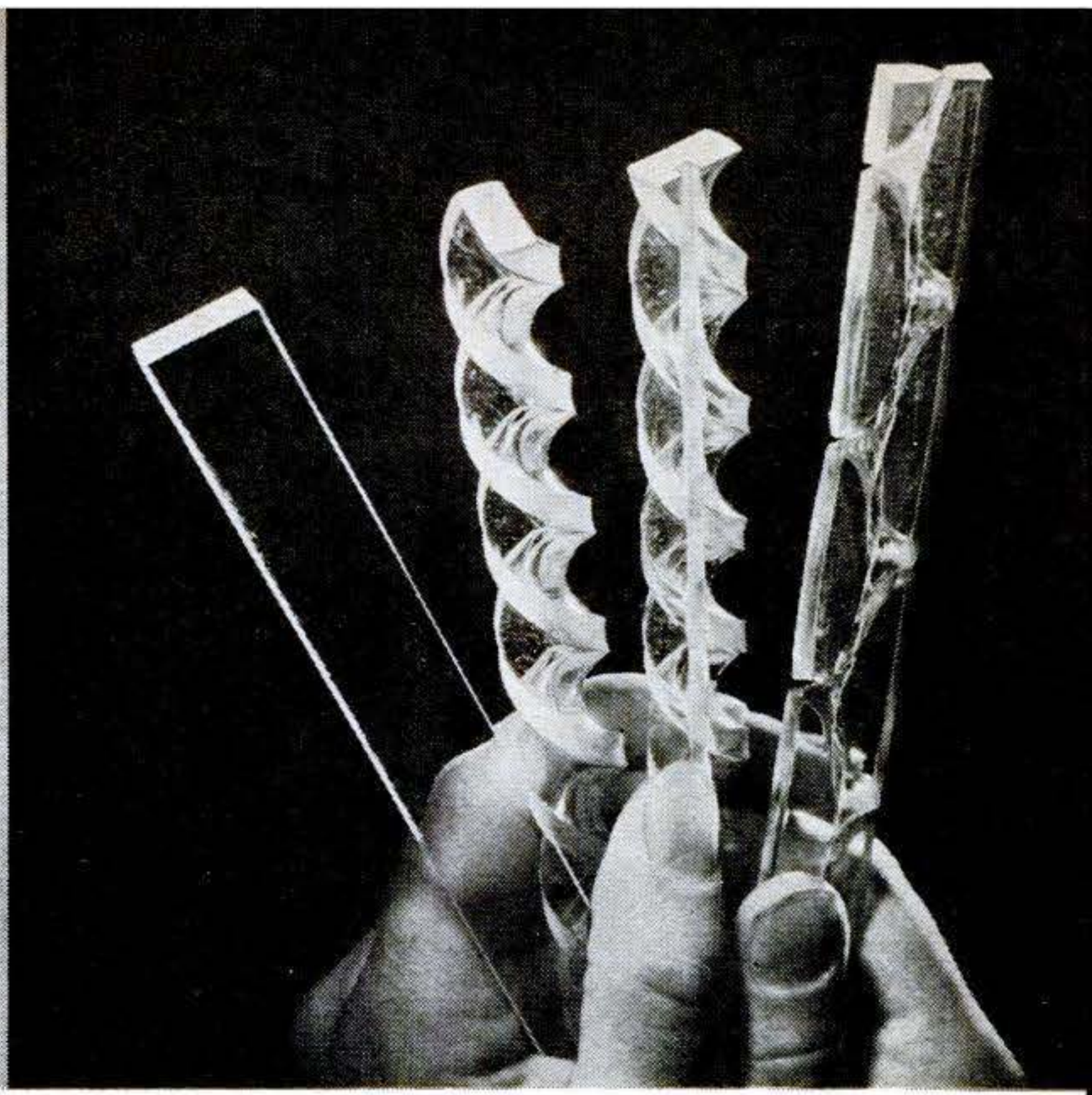


Draw cutter profile on paper, following the squares. Glue to steel and file to a sharp edge.

Copyrighted material



Pattern is inside strips at right and left above, a puzzler to present to your craft-wise friends.



Four steps explain it. Heat-twisted spiral is grooved. On reheating, kerf becomes pattern.

Plastic Memory Creates New Craft Forms

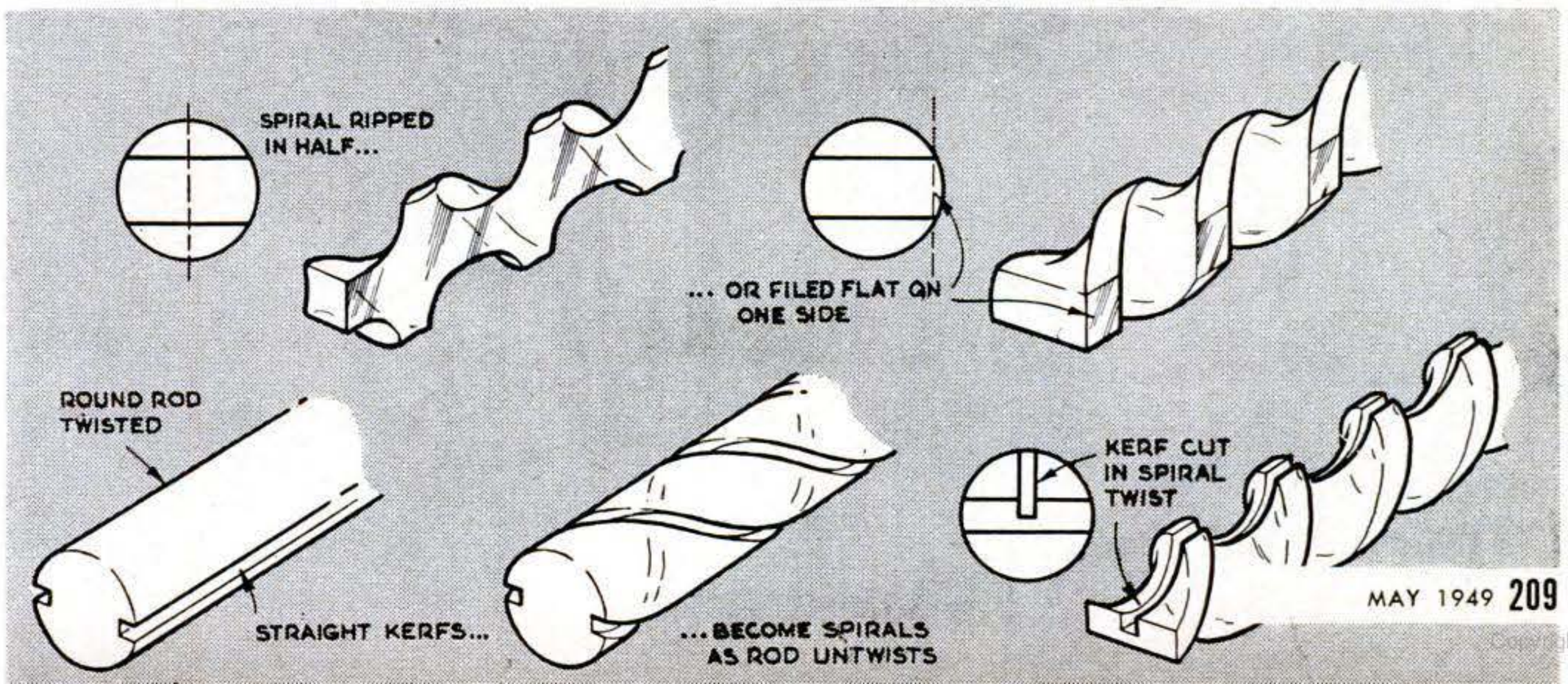
TO LOOK at them, you'd think these ornamental strips would be hours in the making. Two of them have an internal pattern, and few craftsmen can guess how it got there.

The secret is in plastic memory. Acrylics like Plexiglas® and Lucite®, if shaped while hot, return to their original form when reheated. Cut a strip (at left in right-hand photo), heat it until limp, clamp one end fast, and twist to an even spiral. Then run a saw kerf lengthwise, down to the bottom of the twist. Toss the spiral back in the oven, and it'll resolve itself into a flat strip with a zigzag inside cut.

Two kerfs give you a double zigzag. Cut the spiral in half lengthwise, and you get two deeply notched pieces. The narrow strip at left above was made by spiraling and cutting in half a strip ⅜″ square. Another variation is to file or sand off a lengthwise section. Kerfs or cut surfaces can be polished or left frosted, the final effect varying accordingly.

Round stock remains round when moderately twisted, but straight-cut kerfs turn into spiral grooves when it's reheated. This makes good lamp standards; the lamp cord, split into two wires, can run up the grooves. —*M. J. Moch, Jamaica, N. Y.*

Try variations on these examples by using strips of square or other cross section instead.

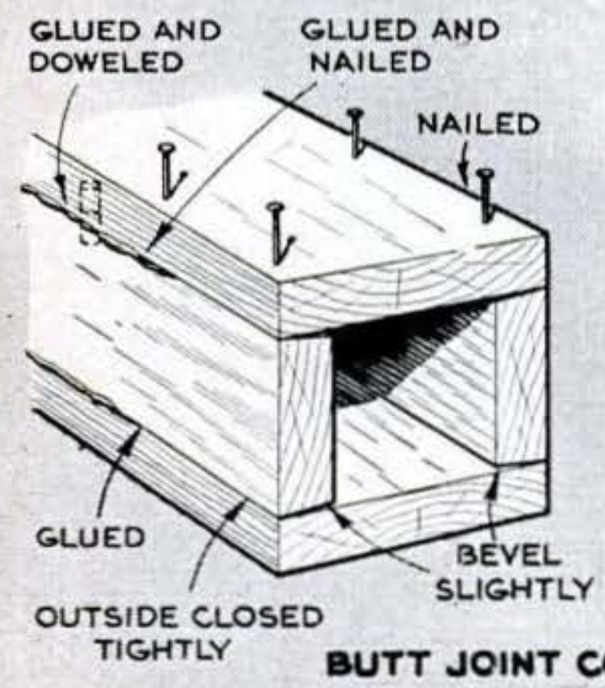


Copyrighted material

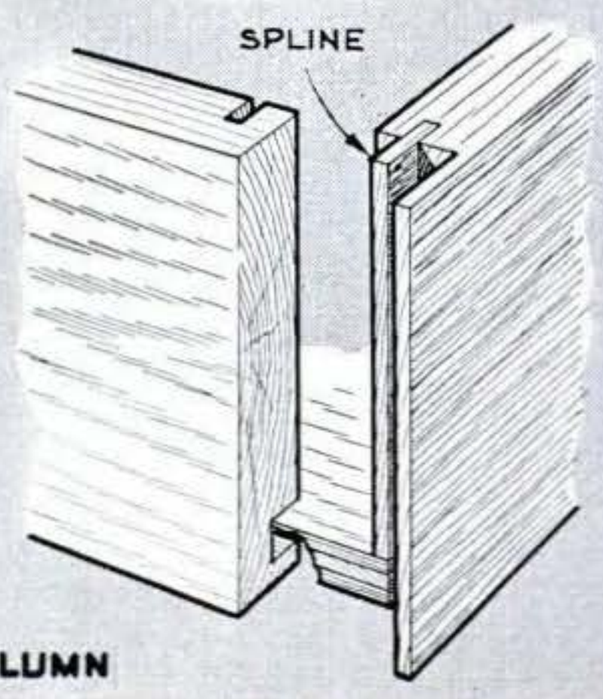
Cutting Corners

By Edwin M. Love

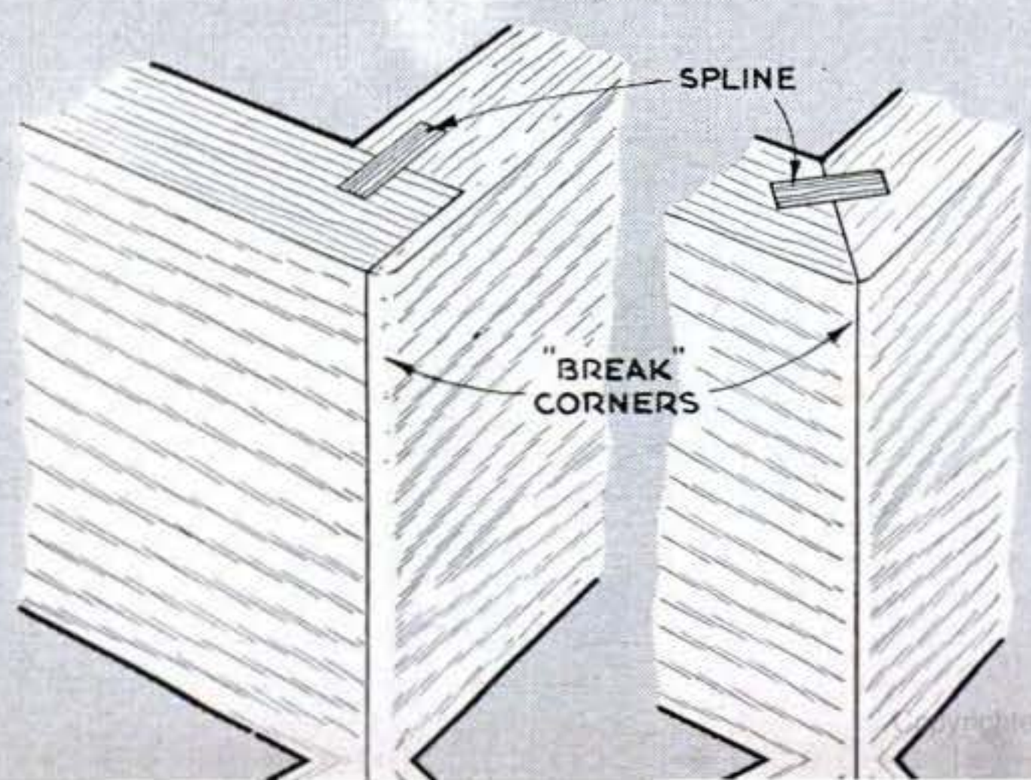
1. On painted or utility work, butt joints usually provide ample strength for column or box corners. Nails, glue, or dowels can be used, depending on the stress the joint has to bear. With fine work, avoid breaks in the grain by using mitered or rabbeted corners.



BUTT JOINT COLUMN



SPLINED RABBET



Butt joints are the easiest to make by hand, but rabbets and miters have a lot else to recommend them.

BOX sides would be easy to cut and fit if boxes had only three joints. It's the fourth that causes all the trouble. There's no wood to spare for a second try at that last joint. It fits—or else. The fit is particularly critical in a mitered corner. A slight error in the angle of an ornamental bevel may go unnoticed, but nothing less than accuracy will make a strong and tight miter joint.

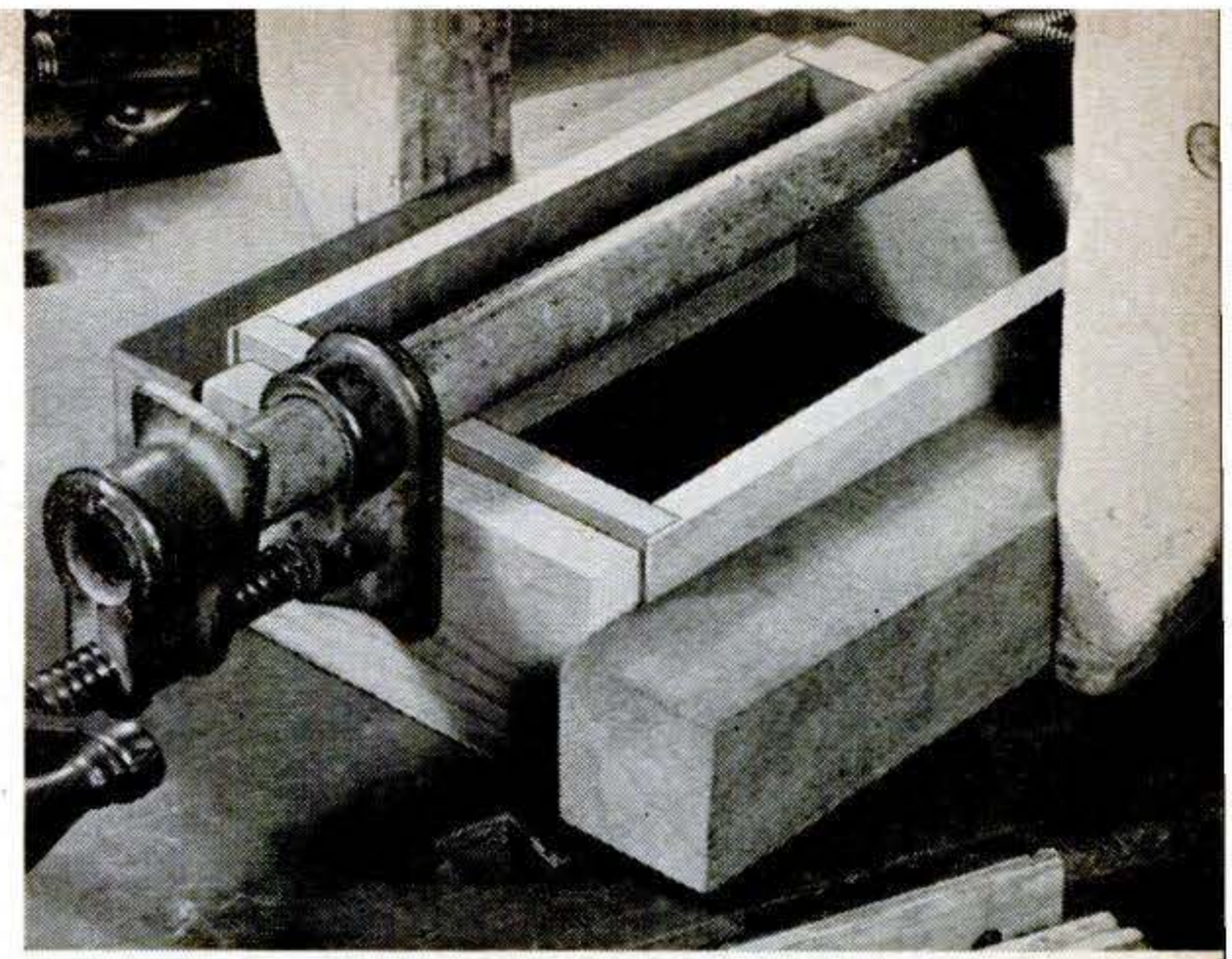
Gluing the parts together is a teaser, too —especially with slippery miters that won't stay put. But while making boxes has its problems, they can usually be licked by proper methods. Doing the job the right way usually means getting it done right.

Butt joints are fairly satisfactory for work that's to be painted or varnished. You can just glue the square ends of one pair of sides to the other pair, or nail the pieces together, using any of the tricks suggested in the left-hand drawing of Fig. 1. Beveling edges slightly inward gives a tight fit at the exposed meeting line. Dowels and glue add strength to a joint and are desirable when the corner has to bear any strain.

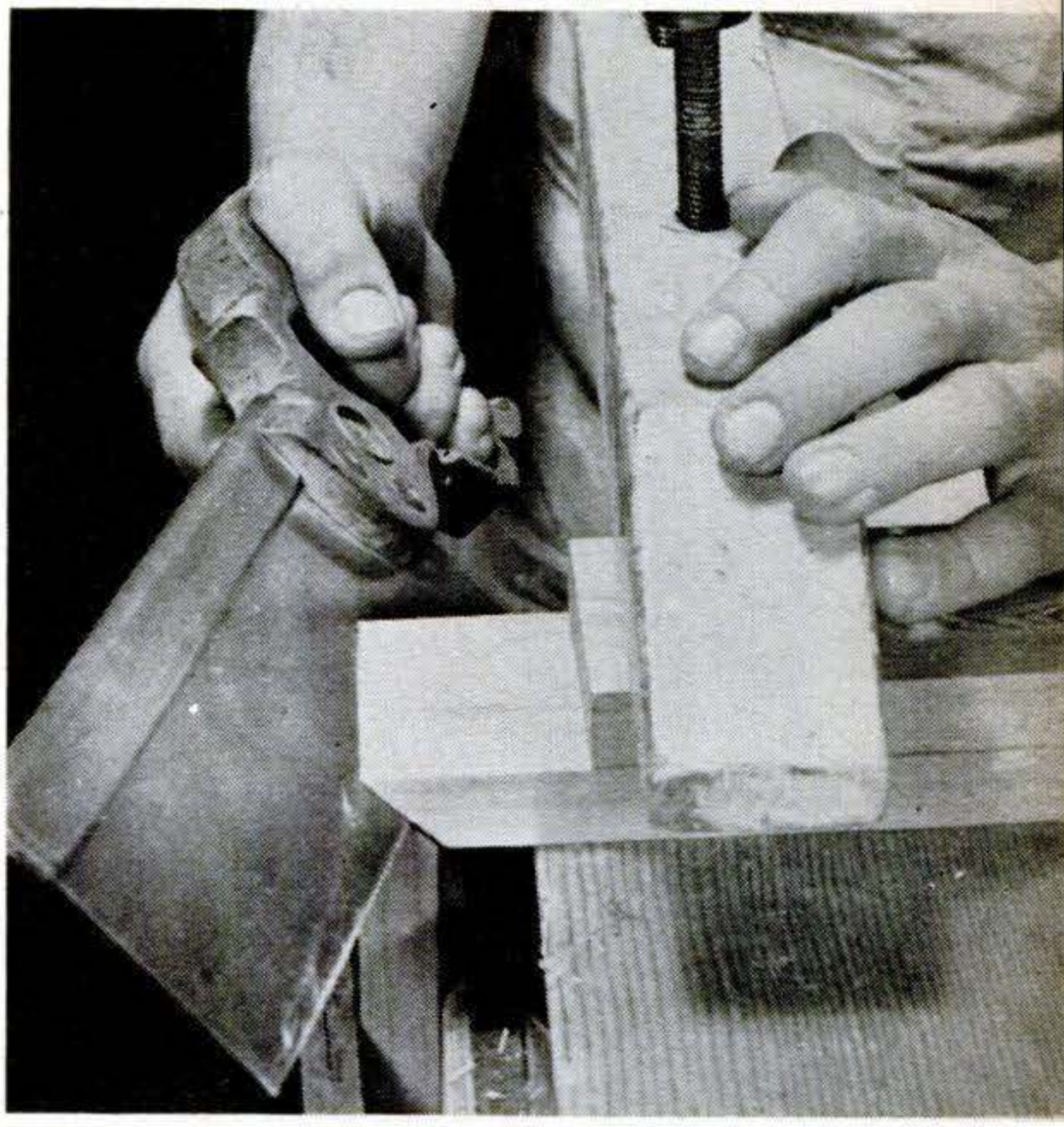
For fine work in beautiful wood you'll want the grain to run continuously around the box either horizontally or vertically. Continuous grain is a must when using plywood with a face veneer, for the ply edges should be hidden. Mitering is just one method of making the corners meet. Rabbeted joints such as shown in Fig. 1 are also first rate. Cut the rabbet to within 1/16" of the face—or to the face veneer when using plywood—and take pains not to split the thin flanges. Aside from the precautions that are necessary because of the thin face layer, these rabbets are made in the usual way.

It usually makes little difference if the size of a rectangular box is off a small fraction of an inch. What does matter is that the opposite sides must have identical dimensions. The price of neglecting this is a cockeyed assembly.

Rabbeted construction gives lots of glue area, but the joints may turn out poorly if the end grain sucks in the glue and leaves the meeting surfaces dry. You can prevent this by sizing end grain with thin glue. Allow the sizing to dry while the clamps are being adjusted. If there's any residue, scrape

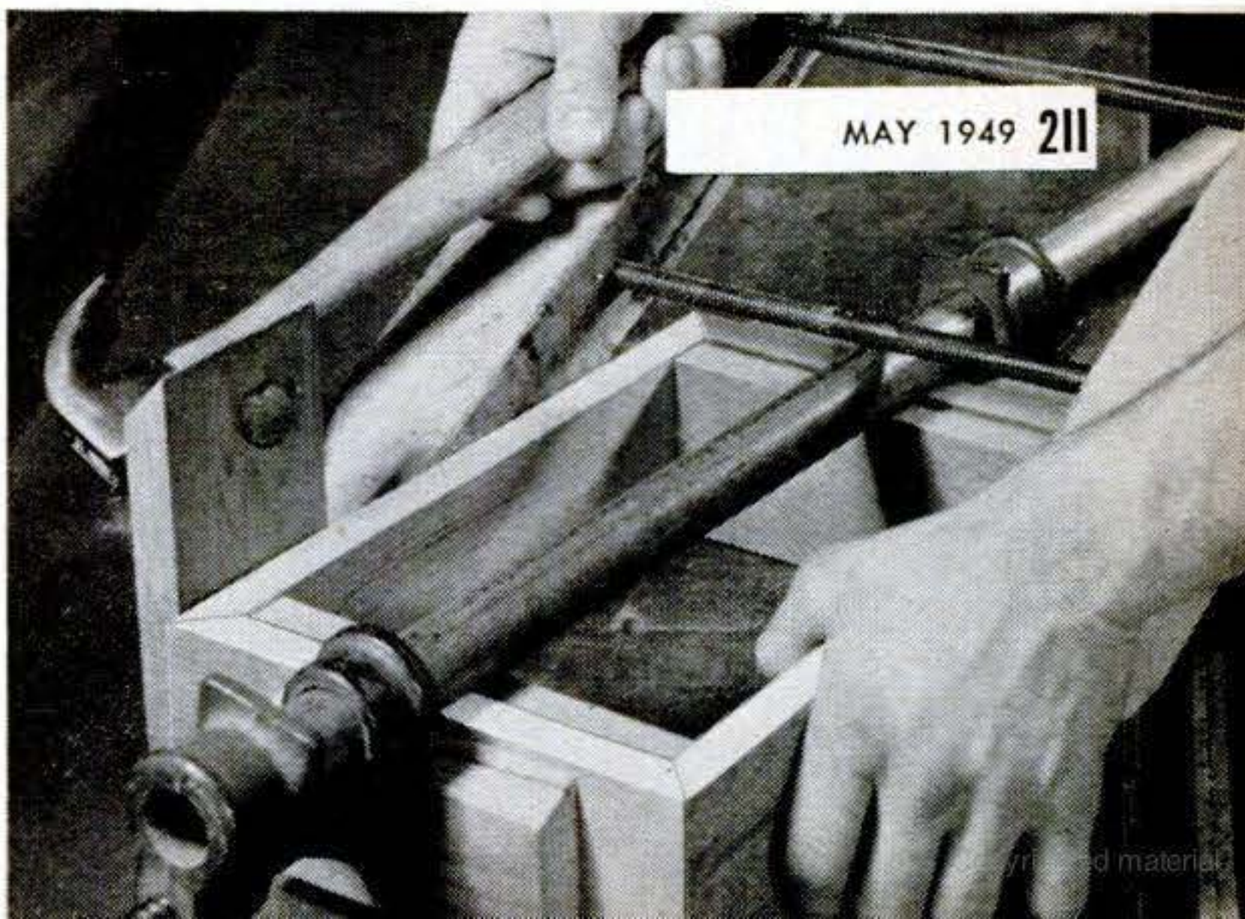


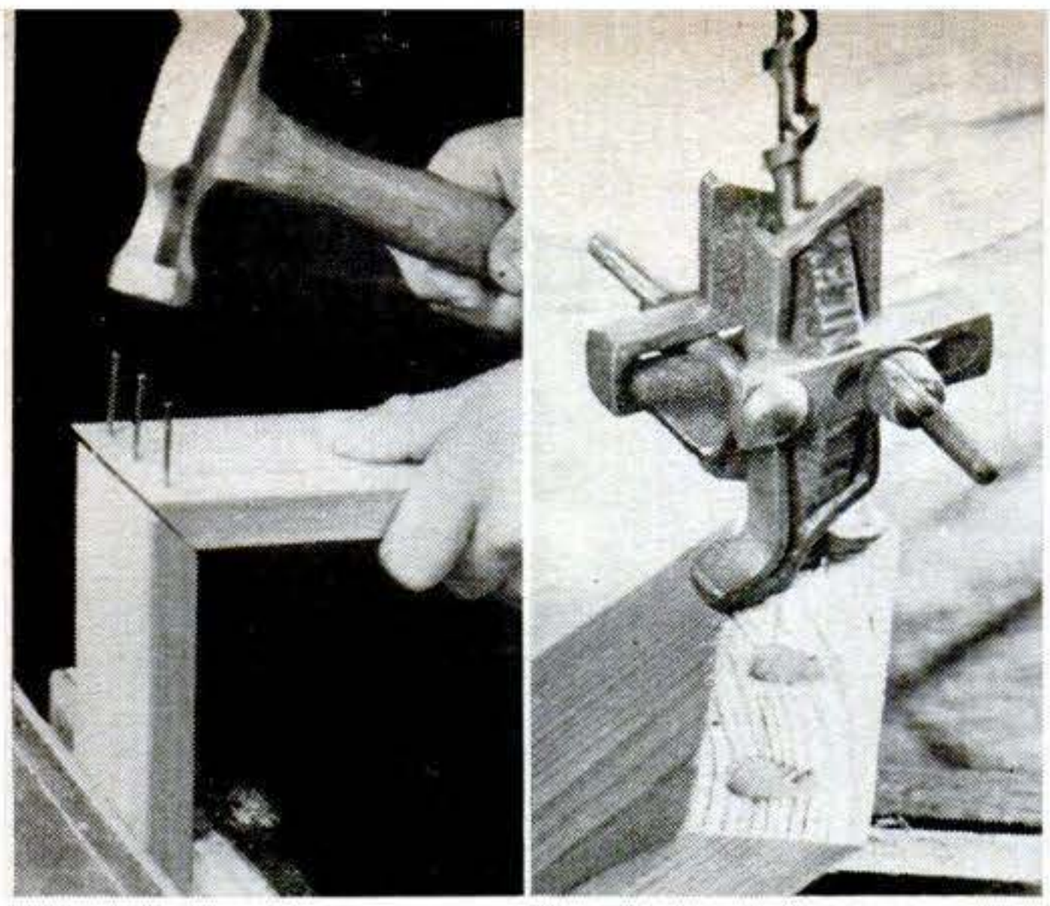
2. Clamp rabbeted joints with protective pads that extend beyond the corners. Wipe off excess glue. Later, trim off any projecting stock.



3. To correct a poor miter cut, clamp the pieces at right angles with the meeting ends close together. Saw between the miters.

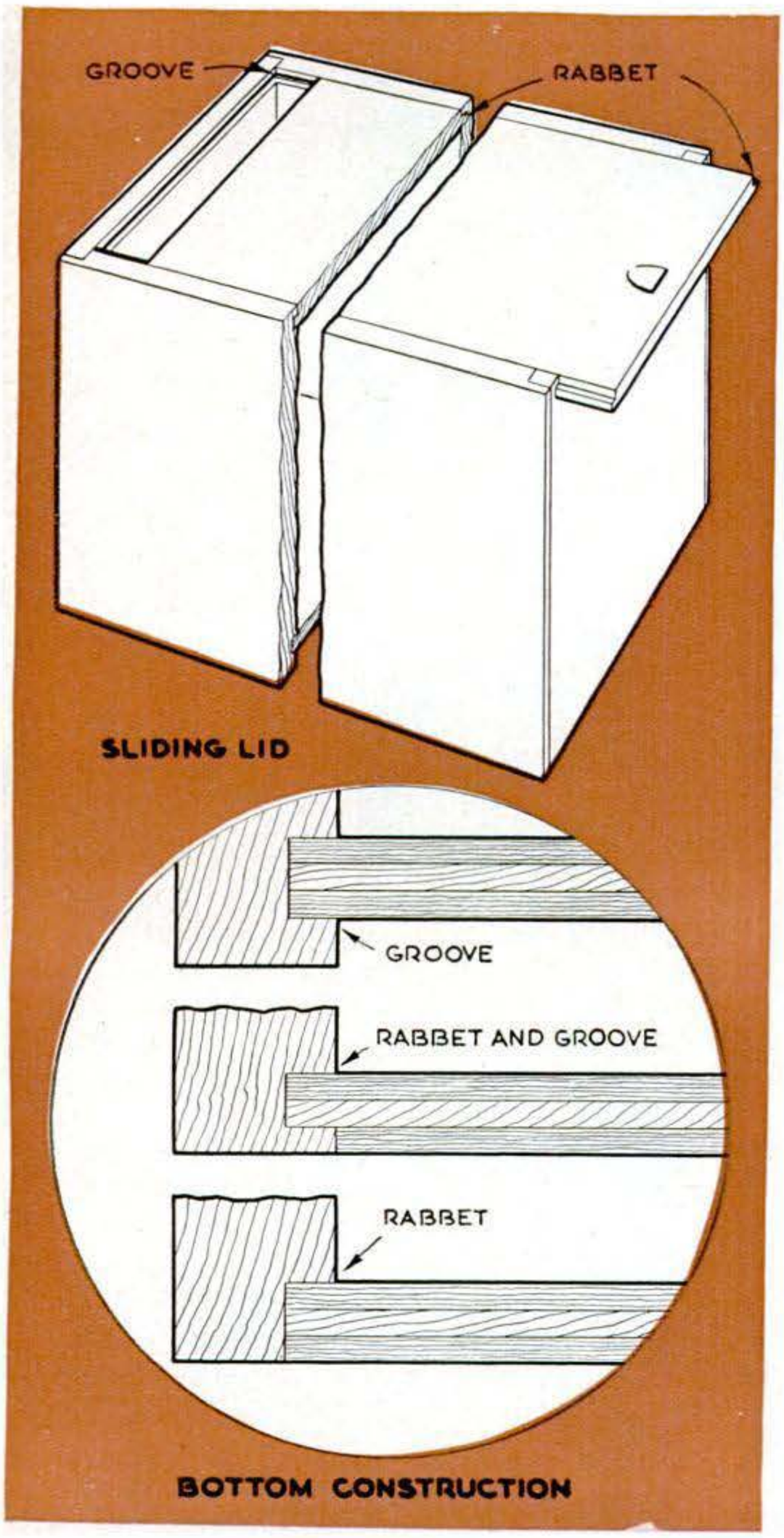
4. Slippery miters can't escape this gluing jig. Sides are first clamped to spacer blocks. Then the ends are clamped to the rigid sides.





5. When nailing miter corners, project one piece over the other. Driving the nails will pull the two pieces together at the edge.

6. Dowel holes should be located toward the back of a mitered end. Clamp the wood in a vise with the miter level at the top.



7. Rabbeted lids sliding in grooves are often used for box tops. Box bottoms are usually one of the three types shown immediately above.

it off before applying the glue for the final assembly.

One method of clamping the box parts is pictured in Fig. 2. The protective side pads must be stiff and long enough to project over the corners, where they can both apply pressure and protect the flanges. End pads should reach nearly to the corners. Be sure the assembly is square, and wipe off squeezed-out glue with a damp rag. When the glue is dry, dress any projecting flanges flush with the ends, "breaking" the corners by rounding them slightly.

A slip-tongue or spline reinforcement is pictured in Fig. 1. In thin stock a heavy saw kerf is wide enough to receive the spline —which is simply a strip of hardwood that has the grain running across the width. Splines increase the strength of a mitered joint and make it easier to assemble the sides and ends. Hardwood 1/16″ thick is all right for light work; in thick stock use pieces up to ¼″. If you're working with hand tools, the larger grooves can be made with a combination plane, or you can make two parallel saw cuts and chisel out the waste between them. In chiseling, work from both ends toward the center.

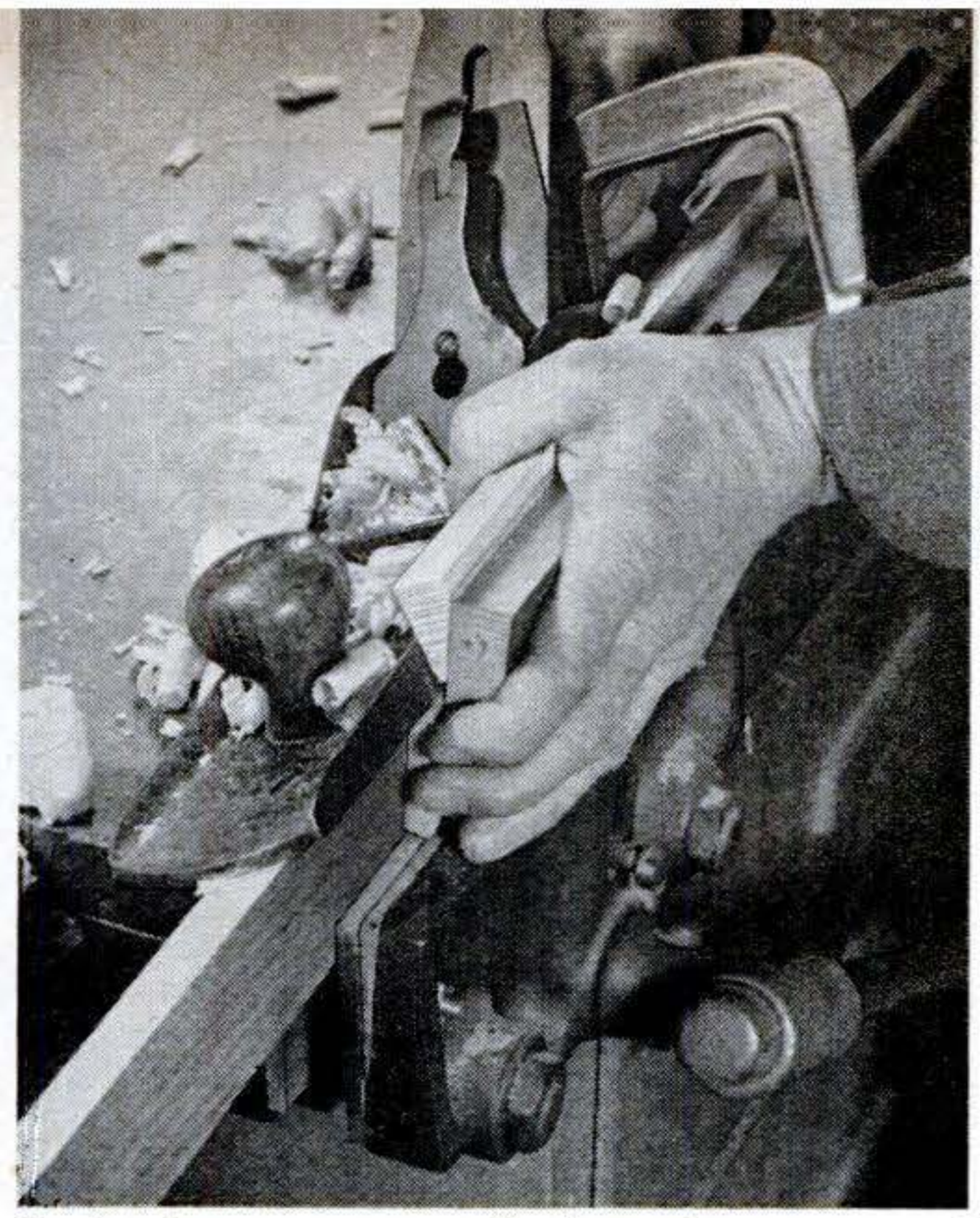
To lay out a miter joint, square a line across one face, draw an angle on each edge connecting with it, and complete it in a line across the other face. The point of a knife is good for marking. Sawing a miter is pictured on page 210. Watch both face lines. If the saw strays from either, twist it back or begin cutting from the other edge. Smooth any roughness with a block plane.

Despite care in sawing, you may end up with a faulty joint. One way to remedy a poor cut is shown in Fig. 3. Clamp one piece in the vise and the other—just touching it—to the bench top. A block may be needed under the horizontal piece to bring it into position. Saw between the miters. If the first cut doesn't make a fit, try a second one. Be sure the pieces are clamped at right angles to each other, and don't forget that the sides will be slightly shortened. Apply sizing to the miters before final gluing.

There's an excellent dodge for clamping miters shown in Fig. 4. The two long sides are clamped to a pair of blocks cut to the exact inside length of the ends. Held tightly in this fashion, they can't slip or move when the mating end pieces are clamped to them. Tap the joints into alignment.

Utility work only requires nailing. Figure 5 shows how this is done. Note that the

Copyrighted material



8. A plane gauge, made from three pieces of wood, is extremely valuable in correcting miters for columns using five or more staves.

9. Column clamps help to assemble the pieces. Rope or baling wire will also do the job but they require greater care in handling.

piece being nailed projects a little beyond the other. The pressure of driving home the nails brings them together at the corner. Lock the joint by driving a couple from the other piece.

A heavy joint is usually improved by doweling. Locate center holes well toward the back where there is more stock. Clamp the piece in a vise with the miter level, and it will be simple to square the holes with it. A bit gauge (Fig. 6) is also a big help. Set it just short of letting the bit point prick through the board, or use a twist drill.

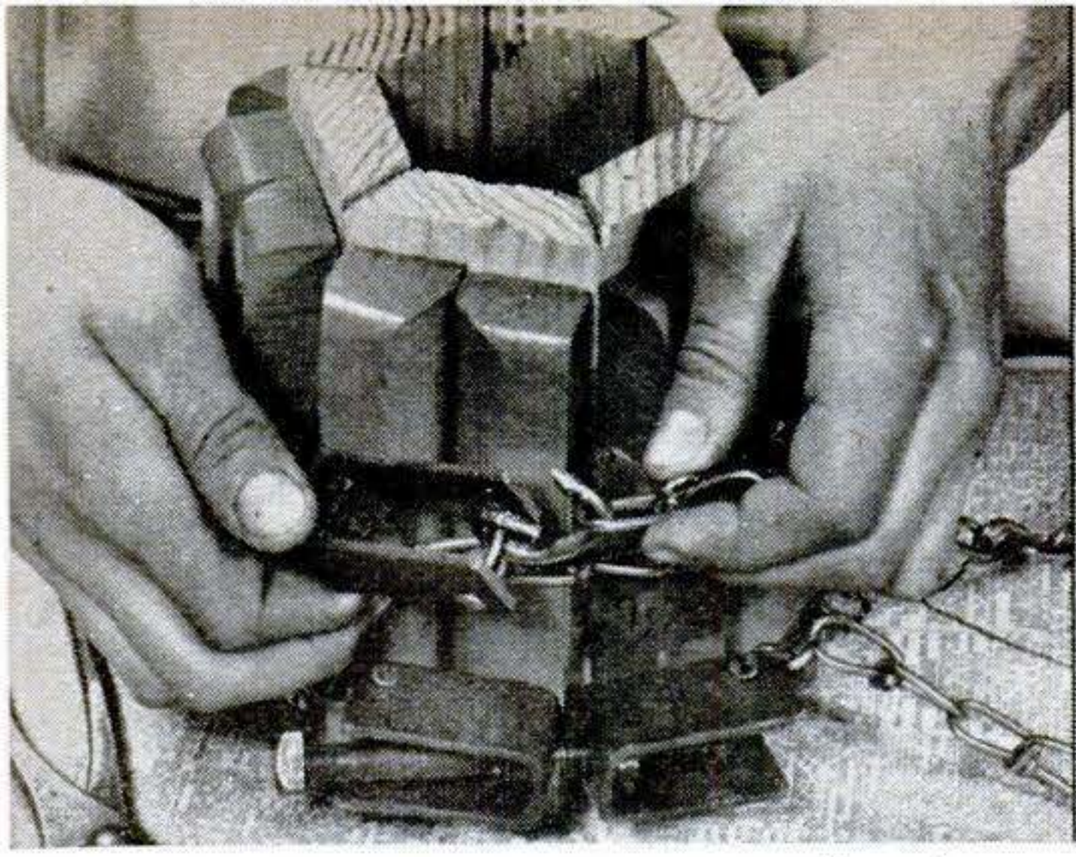
Most box bottoms in light work are fitted into rabbets made in the sides before the pieces are assembled. They can be entered after the sides are glued, and, being out of sight, are often nailed. Greater strength can be obtained without sacrificing inside depth by using the rabbet-and-groove construction shown in Fig. 7. The same construction is suitable for flush sliding lids. It's simpler to enclose the plain edges of the bottom in grooves, but some inside depth will be lost.

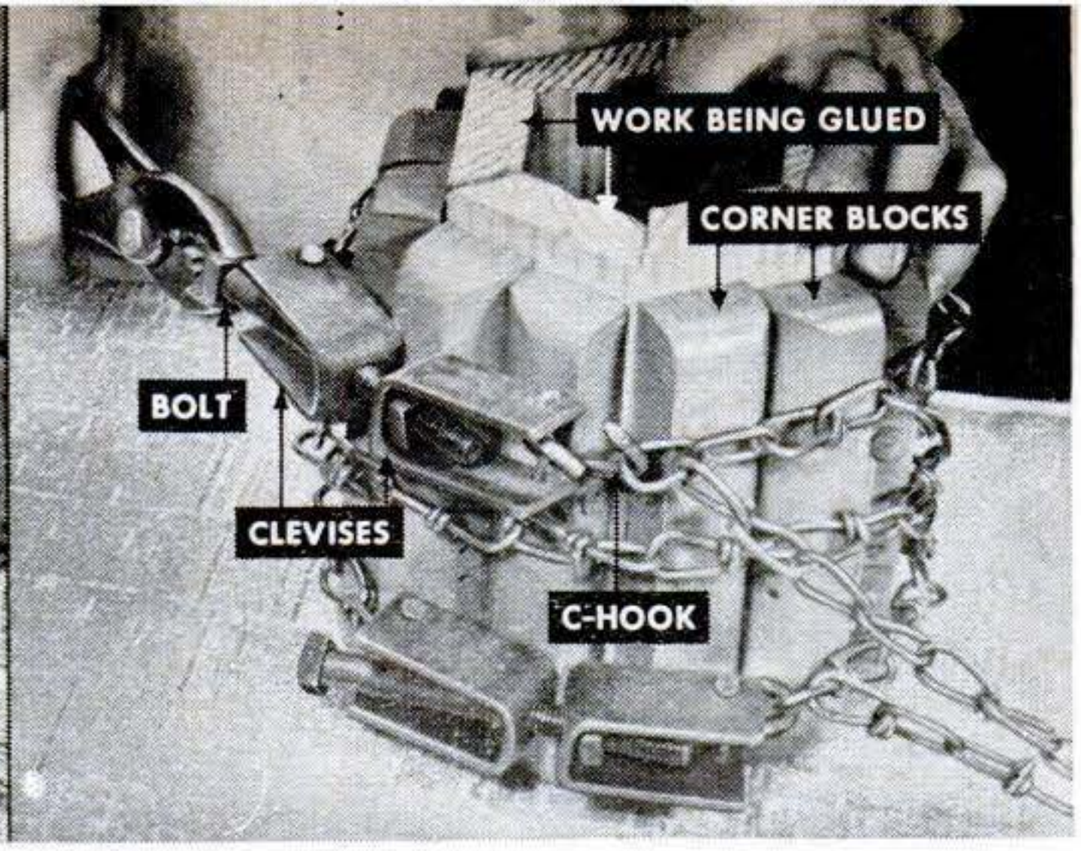
Columns are a kind of extension of box making. The rabbeted corner is convenient for a four-sided post, but mitering is the best solution for a handmade column of five or more sides. No matter how accurately you work, you're almost certain to find one or more faulty joints when you assemble the column without glue to check the fit. A plane gauge is practically indispensable for correcting the miters. Figure 8 shows such a gauge in use. It consists of a strip of wood with a wedge-shaped piece nailed along the top of one face. The strip is clamped to the cheek of a jointer plane. As the plane iron doesn't extend the full width of the plane, a lining strip ¼″ thick is tacked to the inner face of the gauge. Make a test cut on scrap. If the angle is badly off you'll need a different wedge-shaped piece, but small corrections can be made with by shifting the plane-iron position with the lateral adjustment lever. The iron must be sharpened to a straight edge.

Proper handling simplifies the usually troublesome job of assembling a column. Paint the glue rapidly on the edges and stand the pieces on end for assembly. This allows the tackiness of the glue to help hold them together. Have ready a piece of light rope with which to bind the column at the center. Nothing is better than column clamps for assembling, but they are rather special tools and other means are often used. One satisfactory method is to wind rope tightly around the work from one end to the other. Drive wooden wedges under the coils to tighten them up. Baling wire coiled around the column and wedged has the advantage of not stretching like rope. If some staves work out of line, use clamps to force them back and tap the joints into alignment. Assembly is easier, of course, if you spline the work.

Figure 9 shows a homemade column clamp in use. Construction of the clamp is detailed on the following page. END

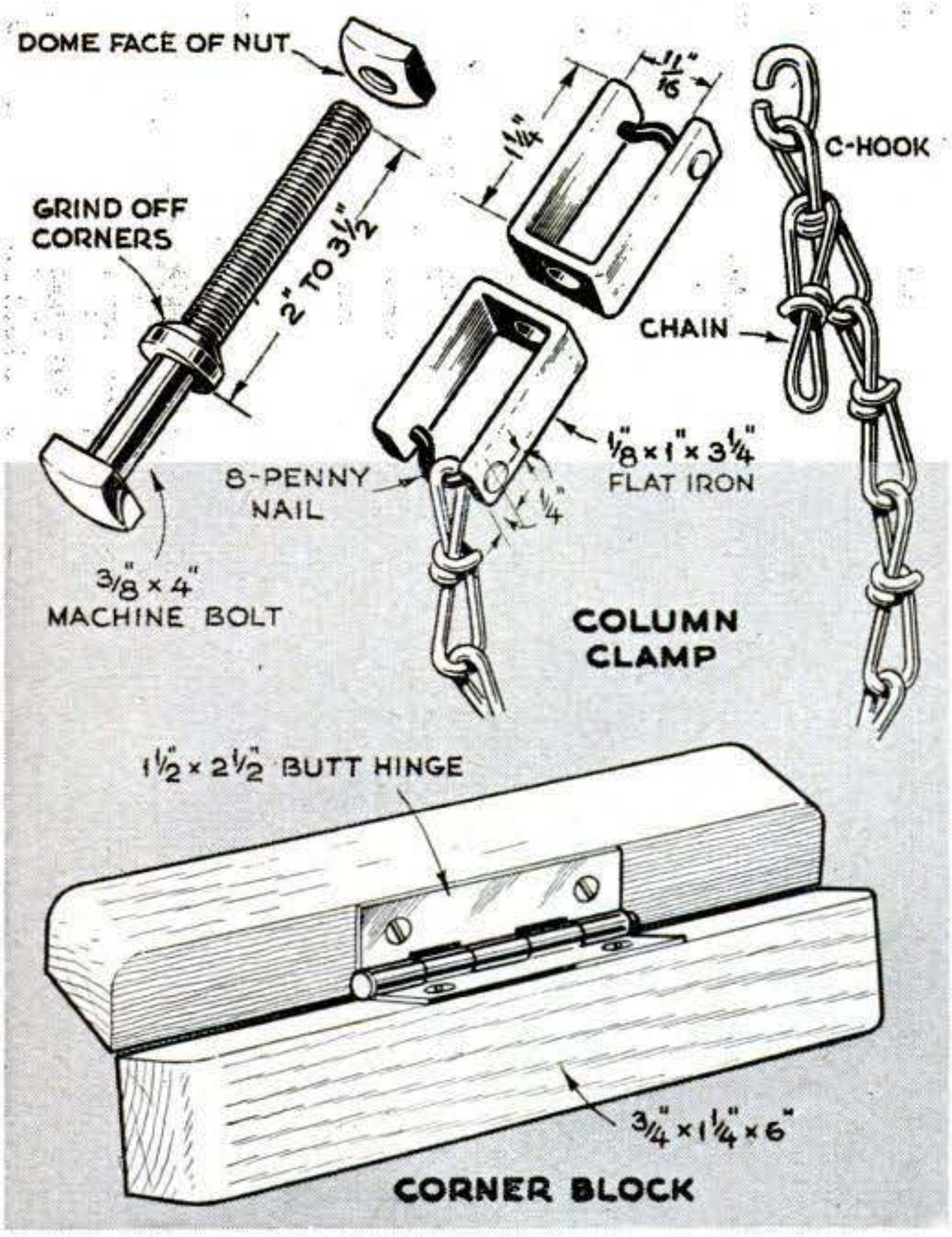
Copyrighted material



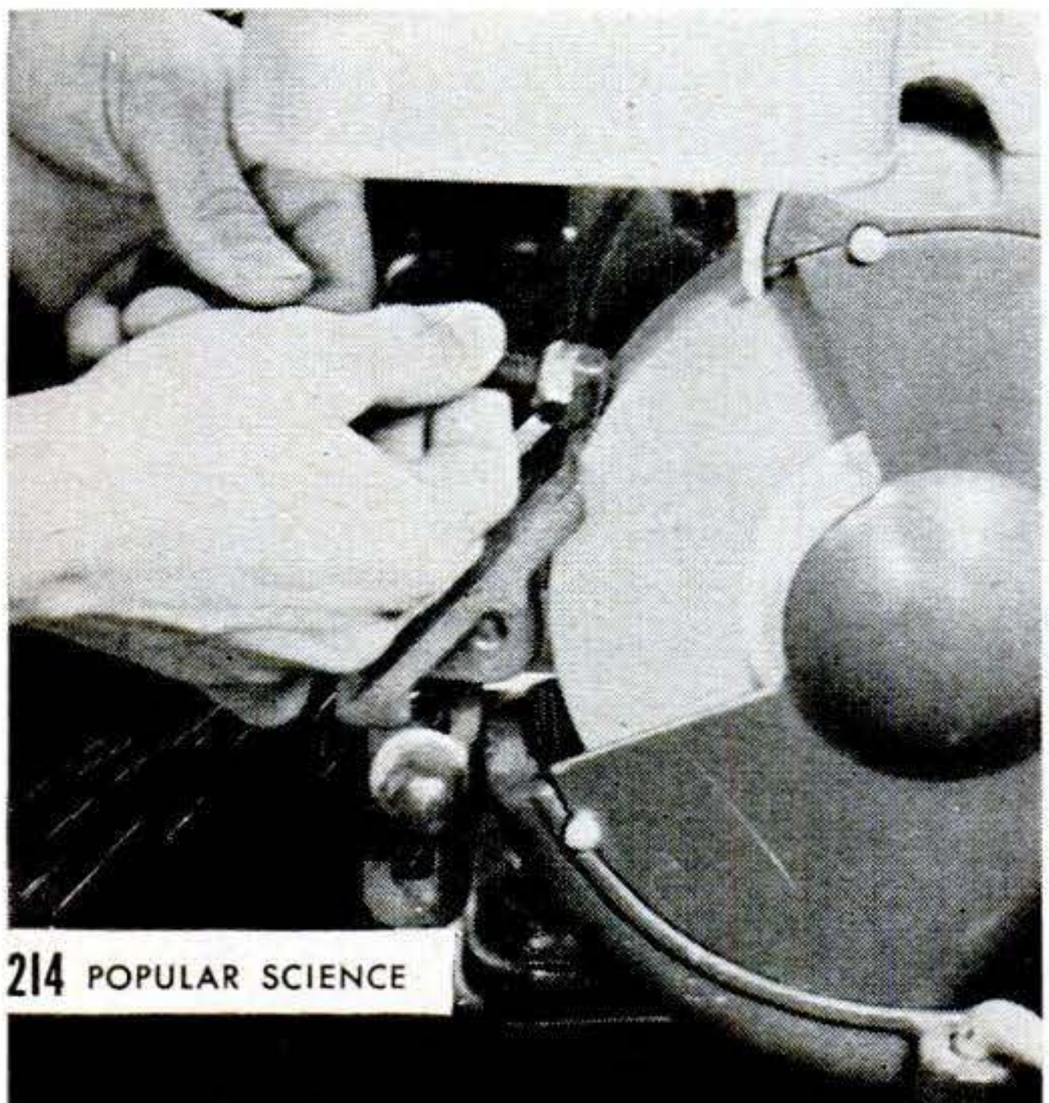


Attach the selected chain link to the clamp clevis with a C-hock bent from heavy wire or a spike. Two sets of clamps are shown above.

Tighten up the clamp bolt with pliers. Domed nuts working in oversize holes permit the clamp halves to be tightened at an angle.



Dome the nuts by grinding. Tighten two against each other on a bolt (below). Interchange the nuts to grind the second one.



Chain Clamps Do Hard Gluing Jobs

COILS of rope or twisted wire are substitutes—but only substitutes—for column clamps. In gluing up the staves of a post or built-up bowl, special clamps usually pay off both in time saved and improved work. For putting columns together, it will be worth your while to make one or more sets of these efficient chain clamps.

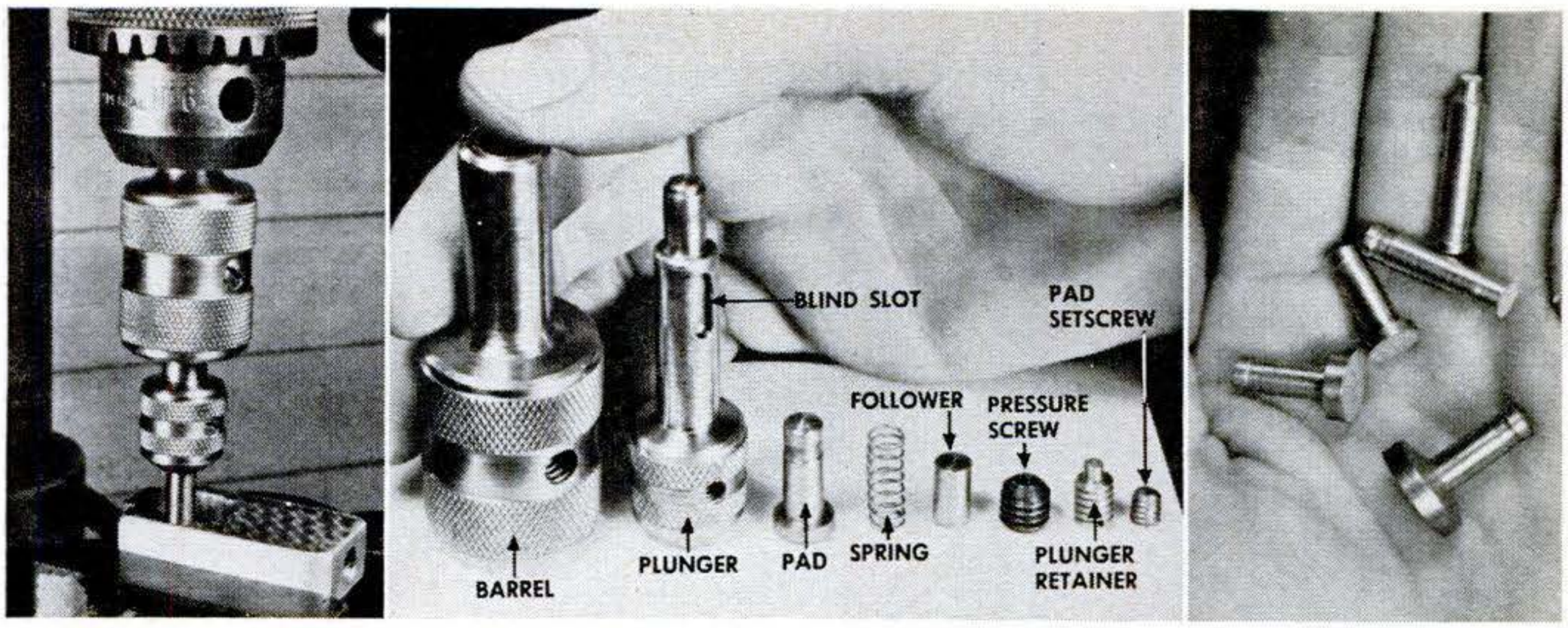
Two pieces of strap iron are bent into U's as shown at the left. The closed ends are drilled 9/16" and countersunk inside. Slip an 8d. nail through an end link of a 3′ to 10′ length of light chain, bend the nail into a shallow loop and pass it through holes in the arms of the U. The loop in the mating U receives the C-hook that is linked to the chain.

If the threaded portion of the bolt is too short, lengthen it by running down a ⅜" die. Grinding a dome on each nut gives a ball-and-socket action to the clamp. One nut of each pair is screwed down to the base of the bolt threads. Insert a bolt in a pair of U's and slip on the second nut.

Hinged corner blocks prevent marring of the work by the clamps. They adapt themselves to any angle and can be made in short order from scraps of hardwood. Round the corners so the chain will fit smoothly.

Before applying glue to the joints, adjust the chain length and insert the C-hook in the right link. When the glue is applied, set the corner blocks and slip the clamp or clamps around the assembled parts. Take up slack by turning the bolt finger tight, tap the joints into alignment, and cinch up on the clamp bolts with pliers or a wrench.—*Edwin M. Love, Palmdale, Calif.*

Copyrighted material



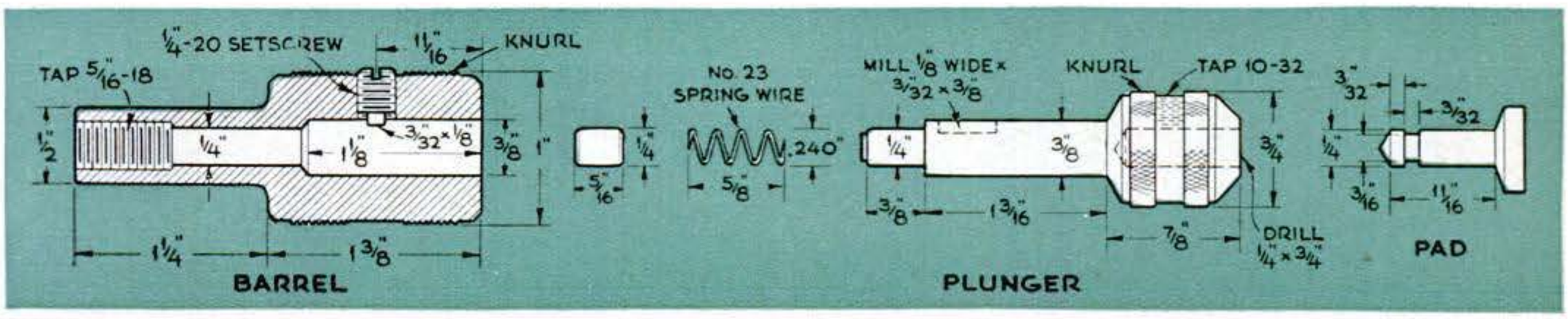
Put the last touch on those pet projects with spot finishing. This spring-loaded pad does a good job. Use a graduated fence to insure uniform spot spacing. Center above, the disassembled tool. An assortment of pads to hold abrasive disks meets a variety of needs.

Spring Pads Do Fine Spot Polishing

SPOT polishing, that de luxe method of finishing fine metalwork, becomes easier to do and more uniform in result with this spring-loaded tool. The cushioned plunger prevents excessive pressure on the abrasive, which lasts longer because the grains aren't crushed, and work is less likely to creep under it. Pressure is adjustable.

All the parts can be cold-rolled steel. The various bores and shanks must be concentric. One way to insure this is to start with the plunger. Turn the shank, and do the knurling, between centers. Then lay this aside and chuck stock for the barrel, knurling close to the chuck and then turning down the shank. Mount the latter in a collet or milling-cutter arbor to drill the two holes inside the barrel. Then you can insert the plunger, with the ¼″-20 setscrew to drive it, and drill the ¼″ hole for the pad. The slot should let the plunger move freely, but not loosely, about ¼″.

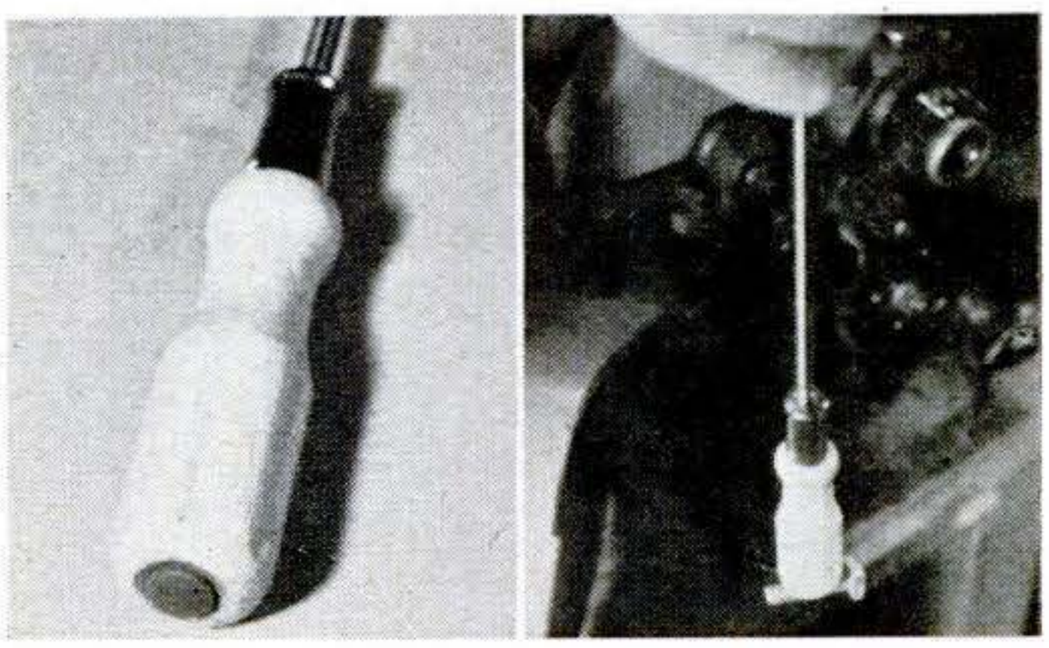
Several pads, with faces from ⅛″ to ⅝″ in diameter, should be made for the abrasive disks. Hold these on with cement.—*John A. Bates, Wise, Va.*



Mill a blind slot in the plunger or, if you have no milling attachment, simply file a flat.

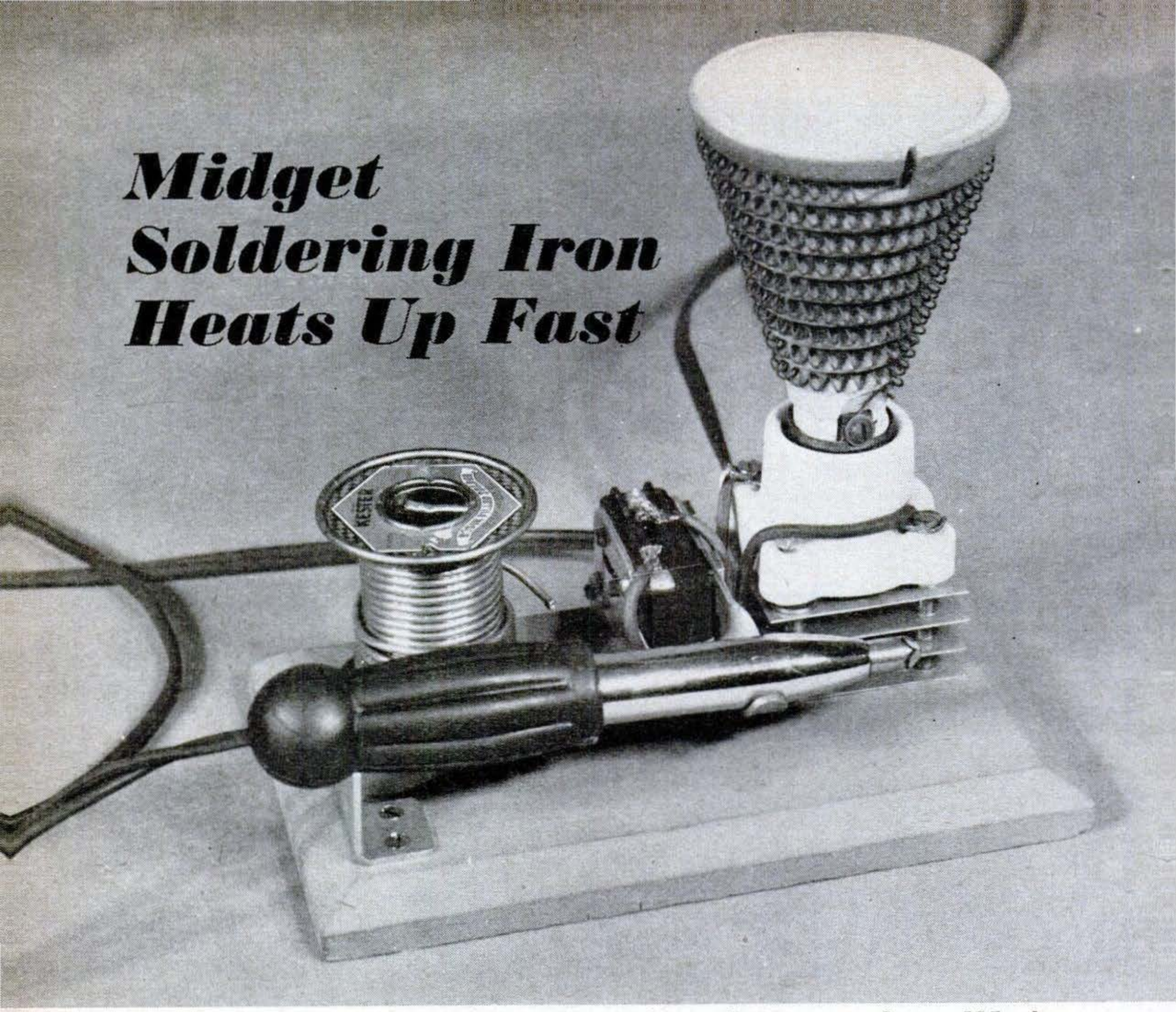
Magnet in Screwdriver Retrieves Small Parts

THE magnet in the handle of this screwdriver picks up bolts, screws, and small parts that are dropped in inaccessible places. I used a magnet about 5/16″ by 1½″ that I bought at a hobby shop. You can either force or cement it into a hole drilled in the handle. It should protrude slightly beyond the hand end and it should not touch the screwdriver blade. The ideal magnet would be an Alnico ®. They're permanent and support great loads.—*W. Thomas, Kenmore, N.Y.*

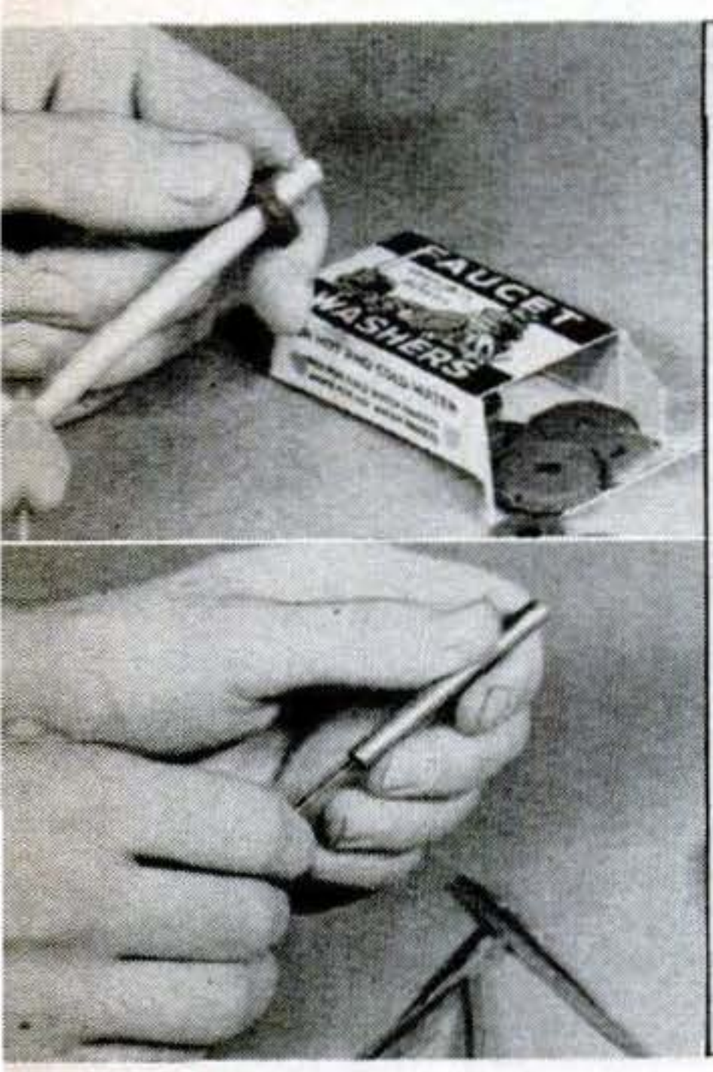


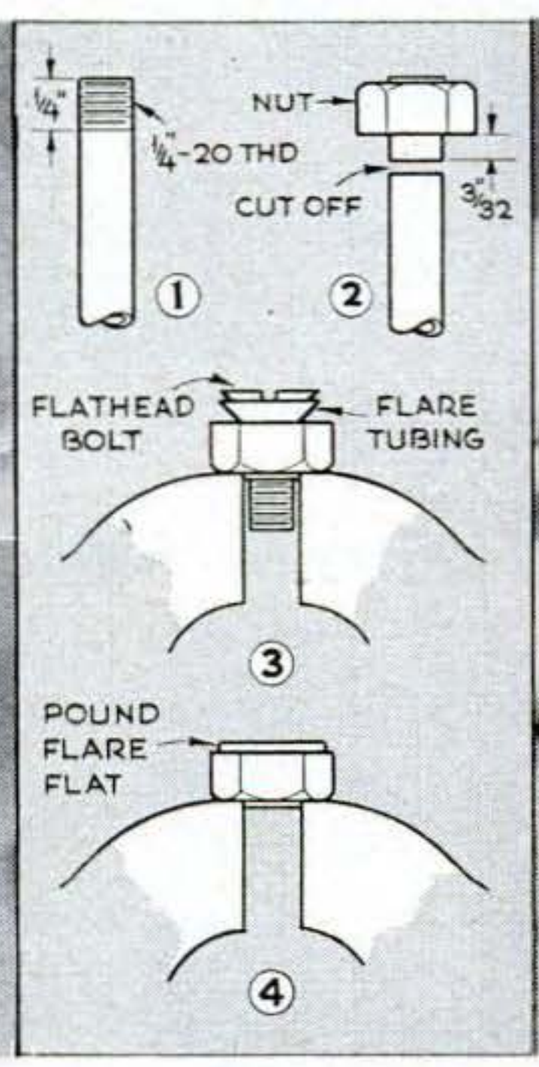
Copyrighted material

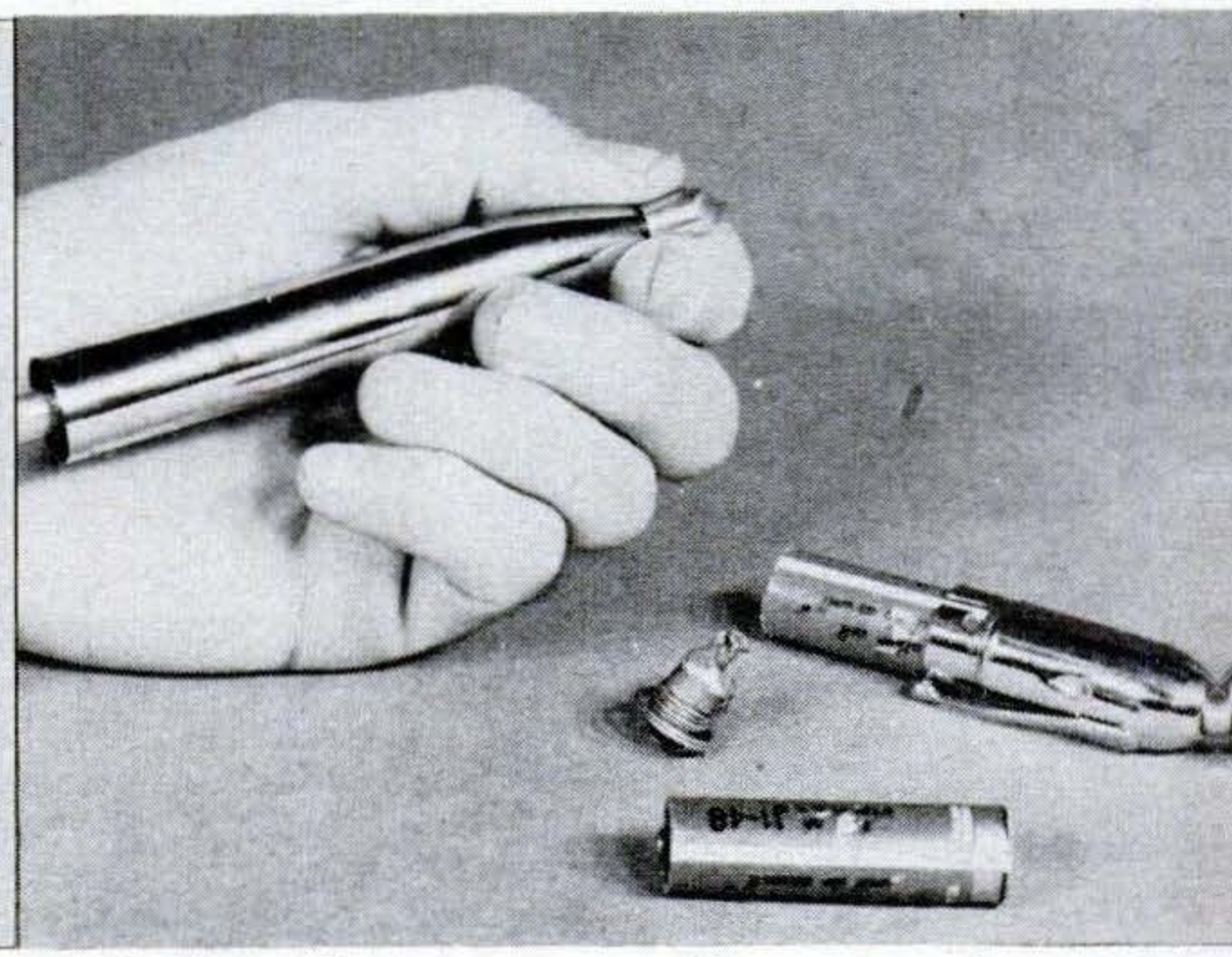
Midget Soldering Iron Heats Up Fast



Carbon in its tip does the trick. A 1,000-watt heater element limits current flow on 115 volts.

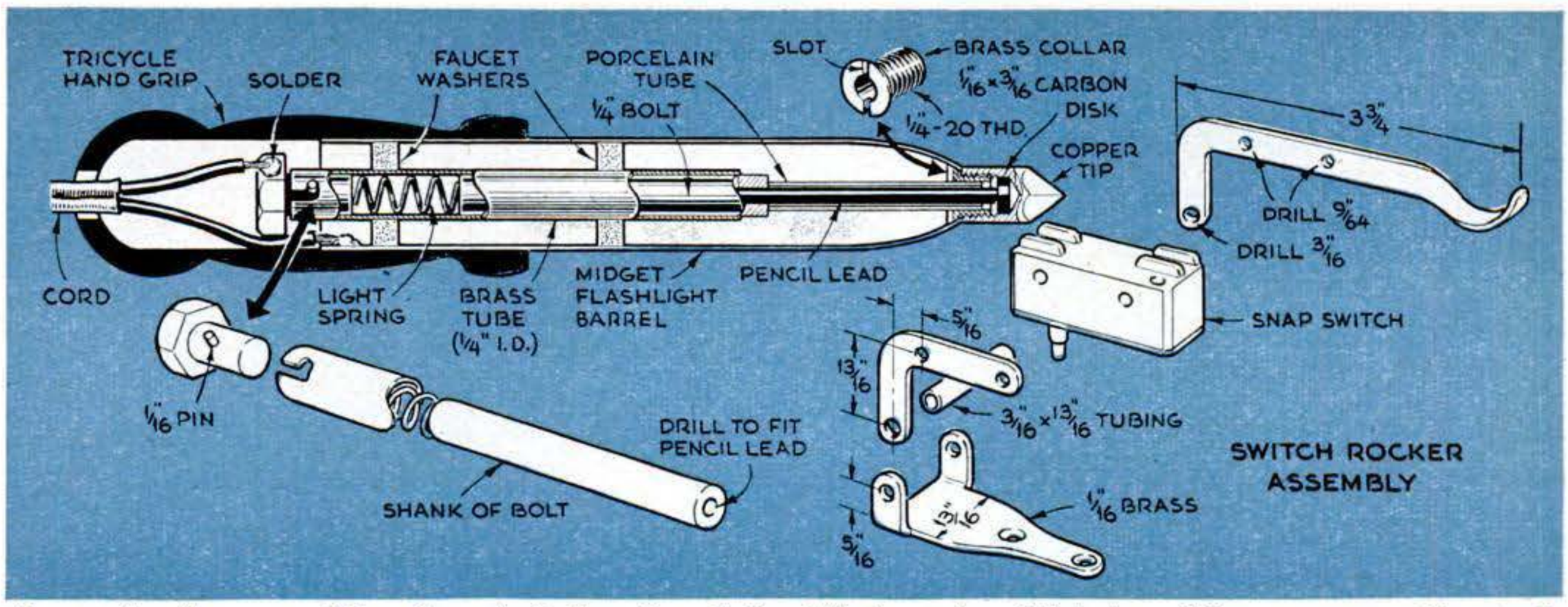






Faucet washers support a pencil-lead element assembly in the barrel of a midget flashlight. Collar for tip can be made by threading piece of tubing (1), turning on nut (2), cutting tubing, flaring the cut end (3), flattening (4), sawing screwdriver slot, and removing nut.

Copyrighted material



Power leads are soldered to bolt head and flashlight tube. Weight of iron turns off switch.

LIFT this handy little soldering iron off its cradle, and it gets hot enough for use in a matter of seconds. Put it back, and the current automatically shuts off. Resistance provided by a 1,000-watt heater element, wired in series, fits the iron to 115-volt current. Without the resistance, it will operate from your car battery.

A carbon element is the secret of its speedy heating. An ordinary pencil lead rests against a carbon disk inside the tip. When sufficient current is passed through, the junction of the carbon and the graphite becomes white hot practically at once.

A chromium-plated midget flashlight tube makes an attractive body for the iron. A tricycle grip serves as a handle. The element assembly consists of a ¼" machine bolt, brass tubing that slips freely over the bolt, a light compression spring, a pencil lead about 1½" long, a disk cut from a 3/16" dry-cell carbon, and a small porcelain tube.

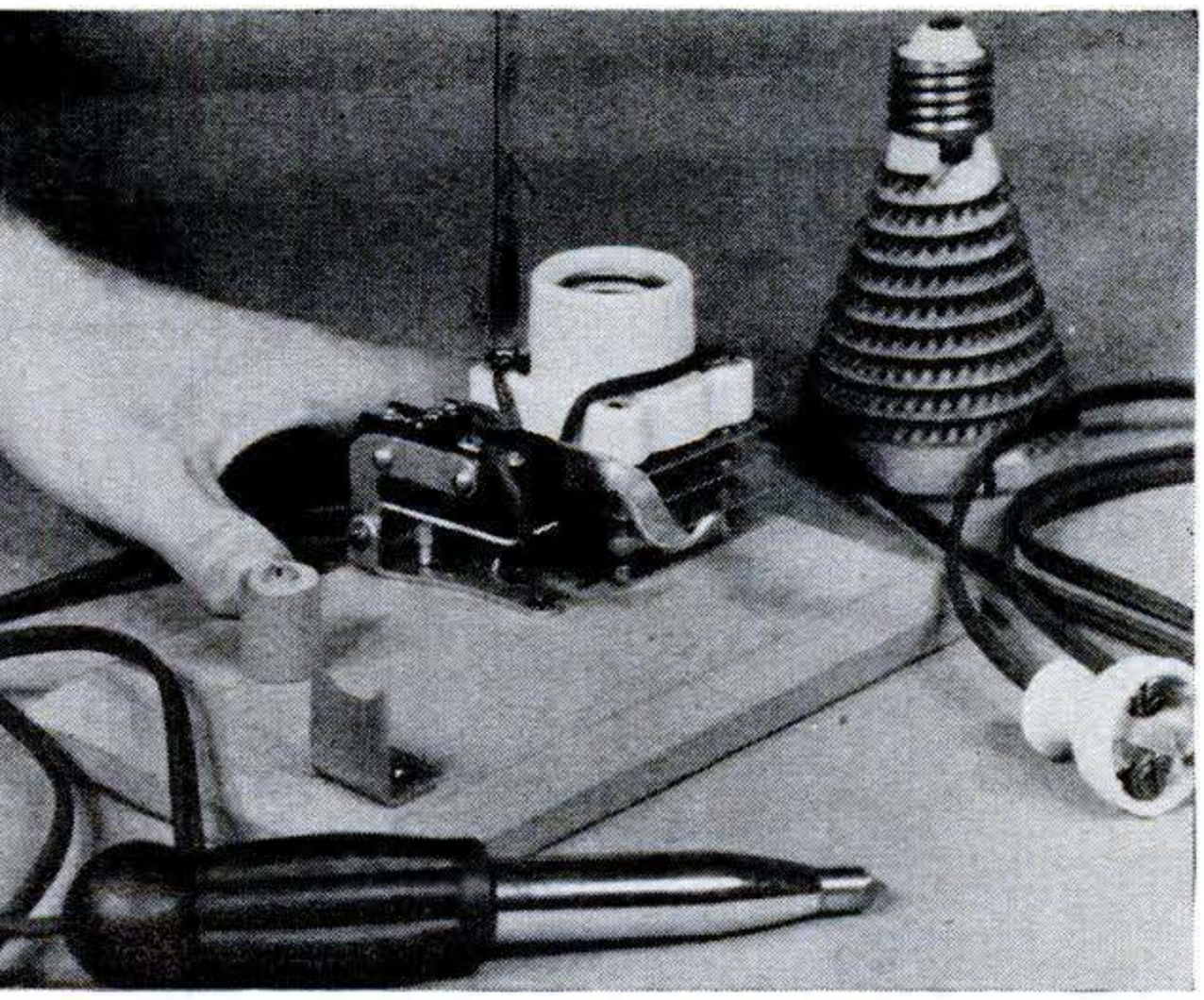
Cut through the bolt about ½" from the head. Drill a transverse hole in the part of the shank that remains with the head and press in a 1/16" pin. Cut an L-shaped slot in one end of the brass tubing so the pin will lock the bolt head in the tubing. Drill one end of the long section of the bolt shank to accommodate a lead taken from a pencil. The lead in an "H" drawing pencil does a good job, but any other with about the same degree of hardness will serve.

A small porcelain tube insulates the pencil lead from the tip collar. You can get a suitable porcelain tube by removing the winding from a small radio resistor. The spring tension should be just enough to keep the lead firmly against the carbon disk. Faucet washers, drilled and filed to suit, center the assembly inside the flashlight casing.

If a lathe is available, you can turn a collar to retain the tip. If not, a collar is easily made from tubing as illustrated in the drawing on the facing page.

Use an existing tip if you have one on hand. Otherwise, you can make one from scratch or cut down a tip taken from a larger iron.

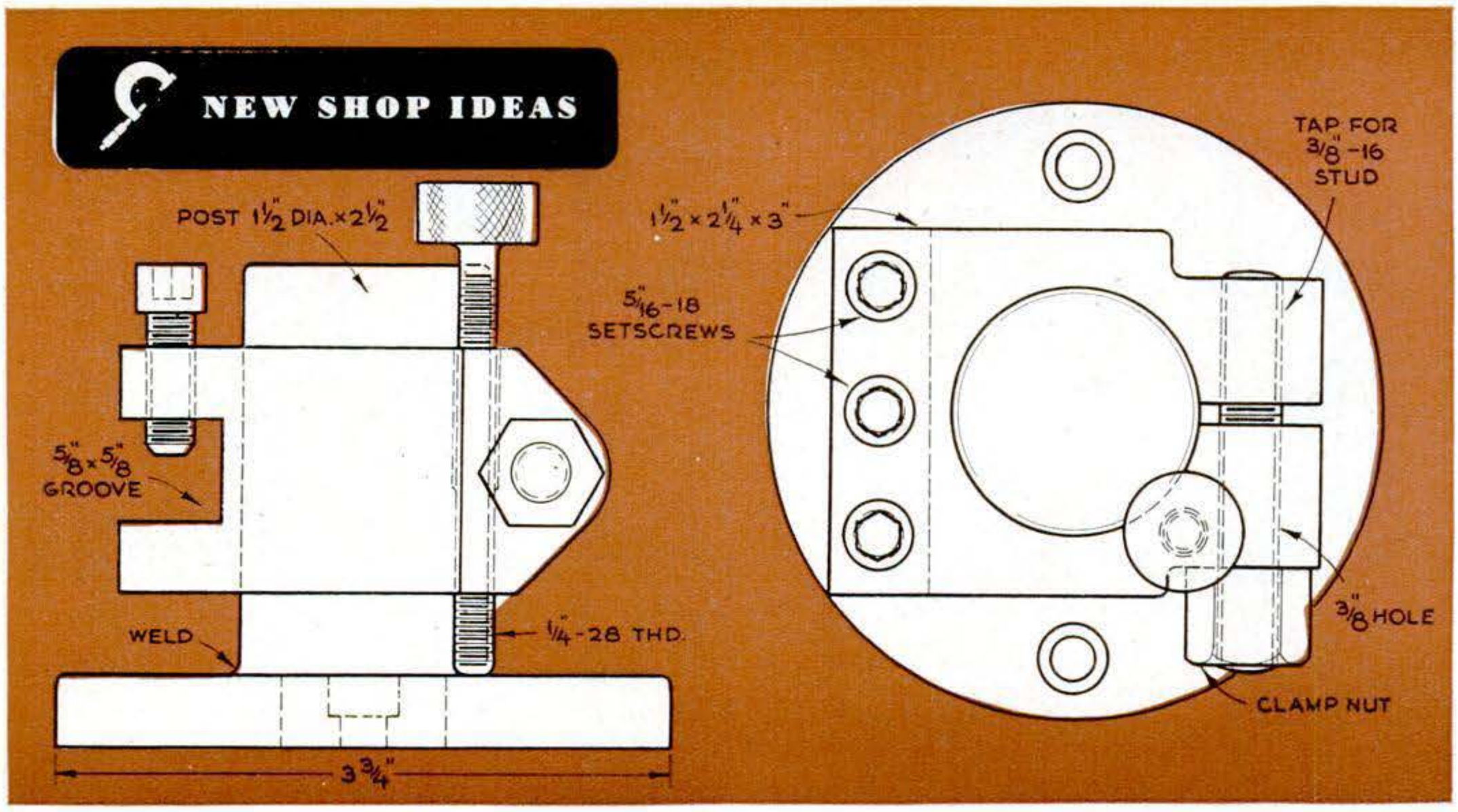
Automatic control of the iron is provided by mounting a normally-on midget snap switch on a brass rocker assembly. A transformer would be best to cut down the voltage. But if you haven't a suitable one, a 1,000-watt heater element mounted as shown and wired in series with the iron and switch will do the job.—*Don Pittwood, Moscow, Idaho.*



Cooling fins elevate the porcelain socket of resistance element. Note that wood base also has a post to retain a spool of wire solder.

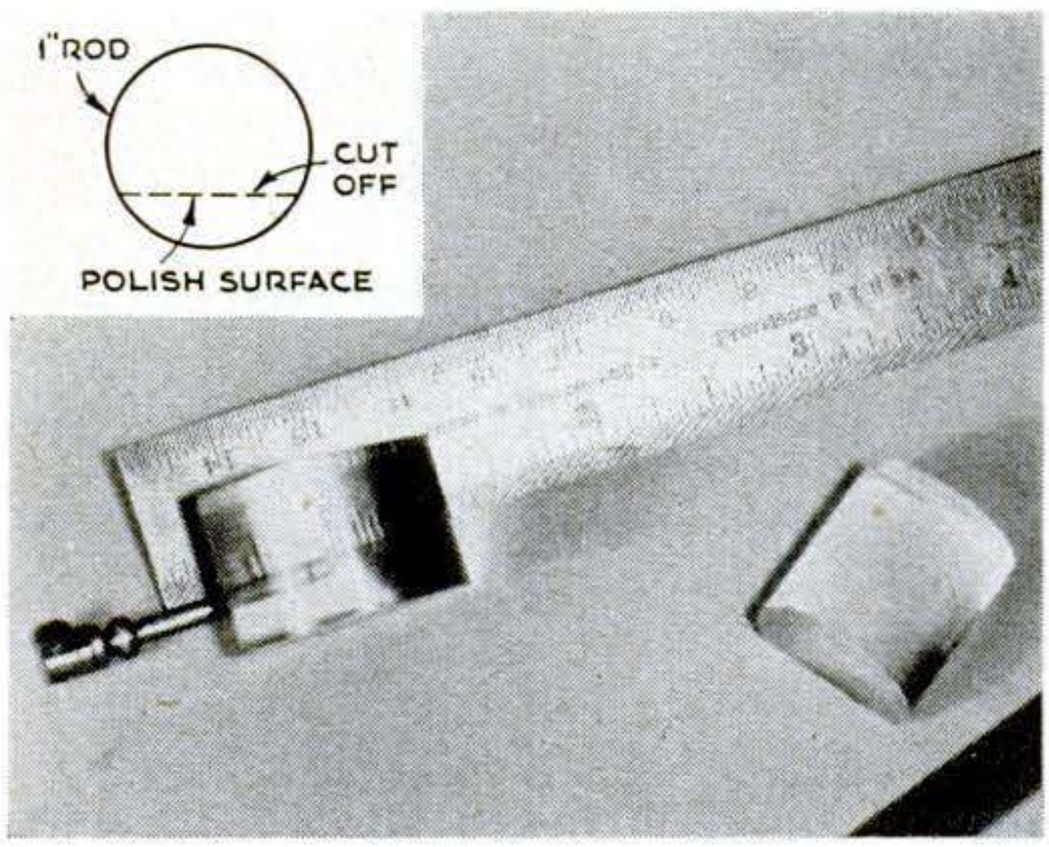
Copyrighted material

NEW SHOP IDEAS

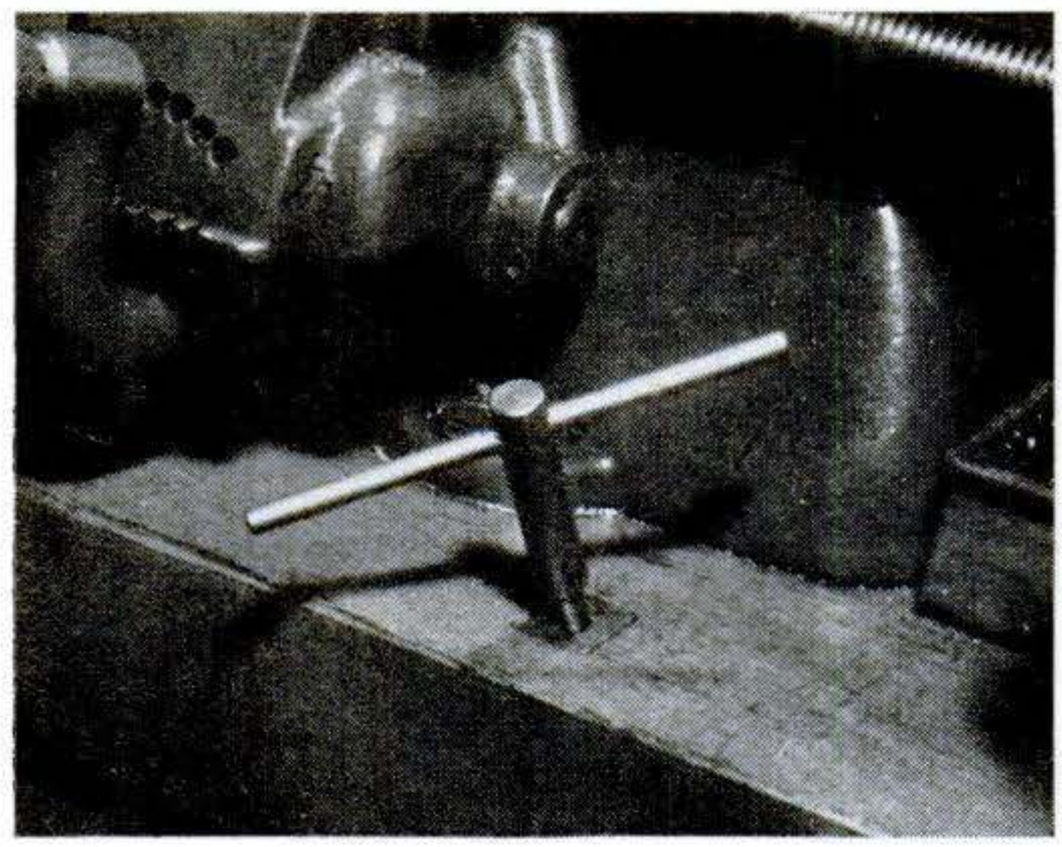


Toolpost Is Rigid. Quickly adjustable for tool height, this toolpost gives the utmost rigidity for boring, turning, and facing. The rake of the tool doesn't alter in height adjustments, as sometimes happens with slotted posts. This rigidity is especially important if you use carbide-tipped tools. The post can be swung in a full circle.

Use mild steel in making it. As the drawing suggests, the post can be turned with a tenon to fit a hole bored in the base disk, and the two members then welded together. However, if you have stock of sufficient size you could turn the base and post as one piece. Remove the compound rest and mount the post with two socket screws of suitable size countersunk in the base. The compound and regular toolpost can be quickly restored when needed.—*A. E. Kerswell, San Bernardino, Calif.*

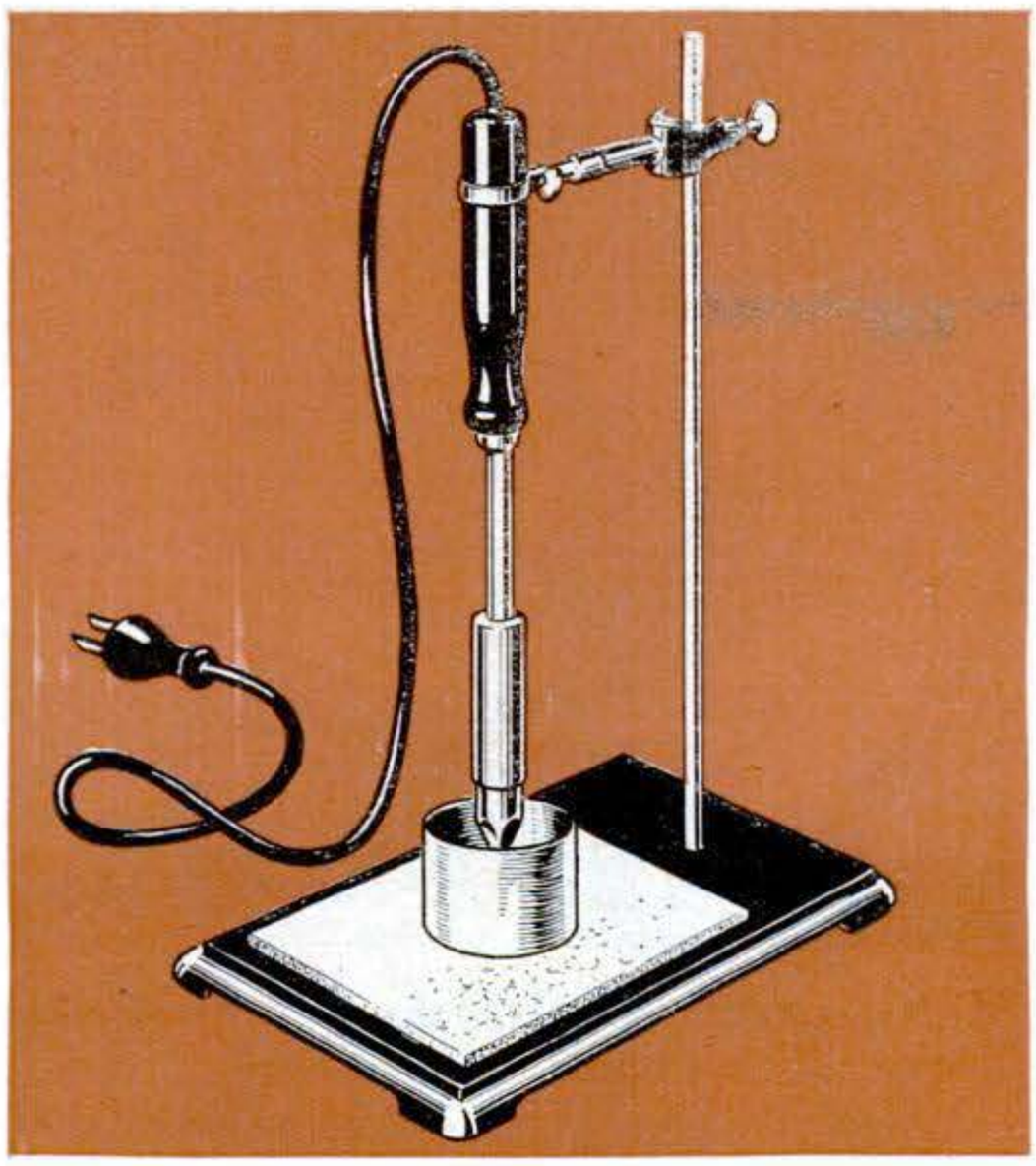


Shop Lenses Cut from Plastic. Starting with a 1" clear-plastic rod, you can make useful, practically unbreakable lenses for your shop. Pick an area of rod that's free of scratches and saw off a short length. Grind a flat as in the drawing and polish it. Placed with its axis across a ruler as above, the lens widens the divisions. Such a lens does a good job over the collar of a lathe feed screw.

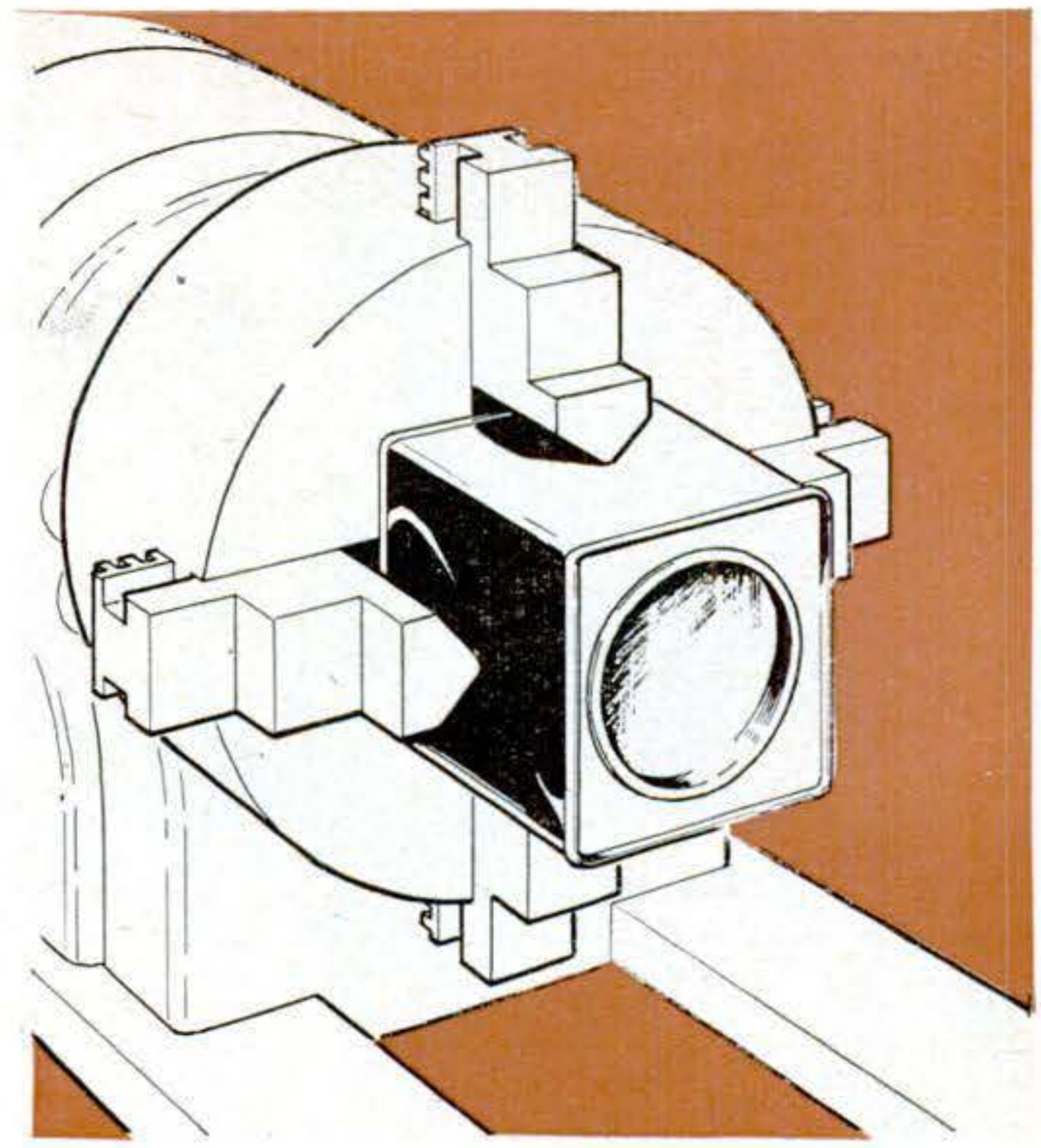


Keep Your Chuck Key Handy. If your lathe chuck key has a habit of hiding, here's one way you can keep track of it. Drill a hole at an angle through a ¼" plate and countersink the plate at a convenient spot in the bench. Or, if you prefer, just bore a hole in the bench top and omit the plate. The idea won't work, of course, unless you put the key back each time.—*Dwight Durkee, Jr., Cupertino, Calif.*

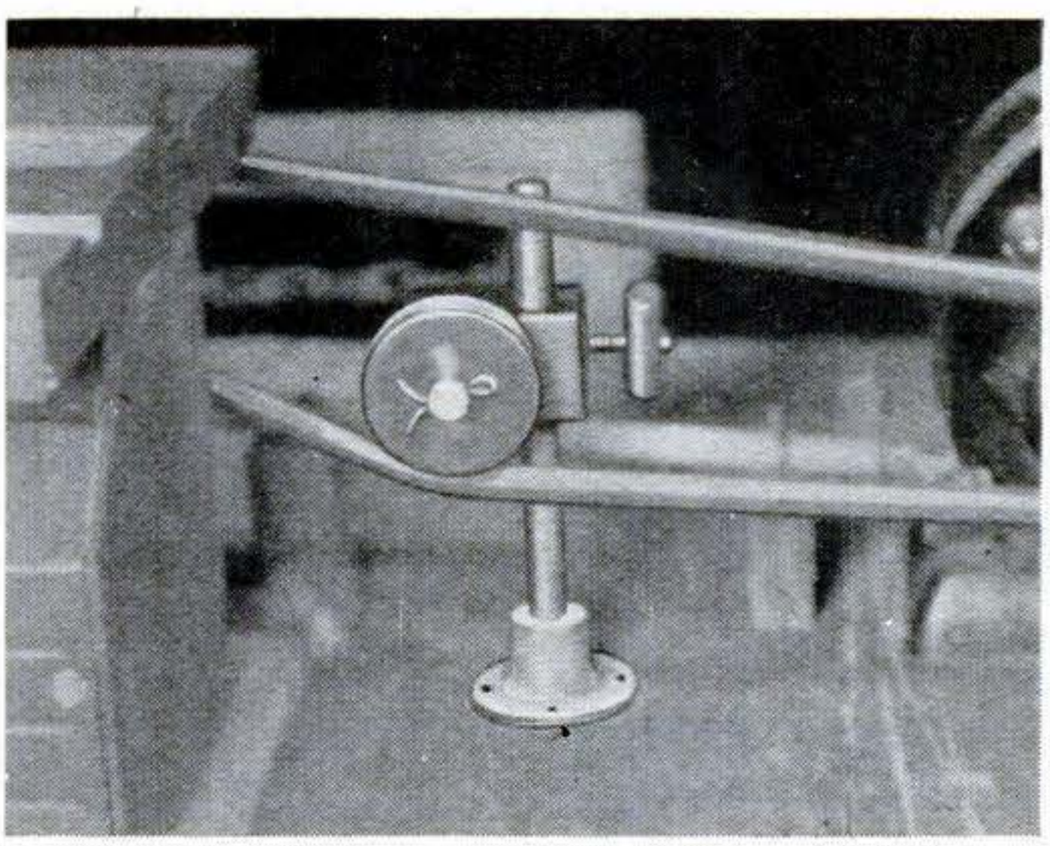
Copyrighted material



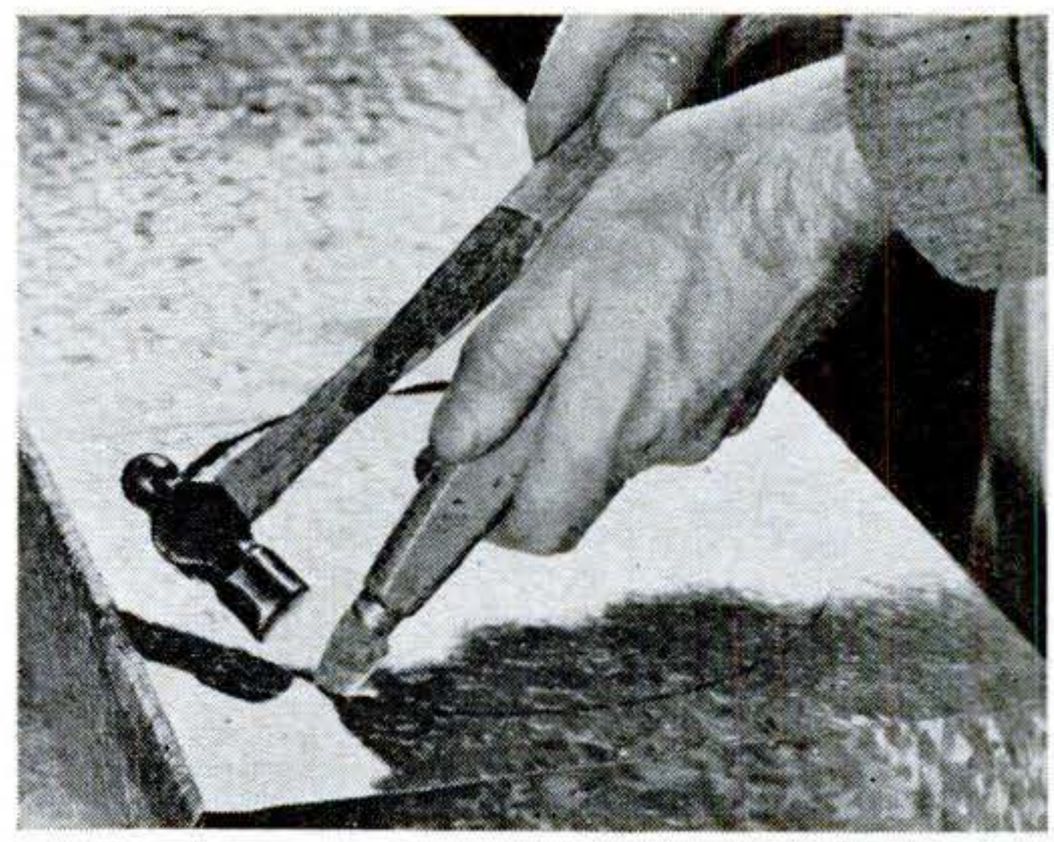
Melting Solder for Tinning. A soldering iron clamped to a laboratory stand is a good source of heat for melting solder and lead for dip tinning or casting of jewelry pieces. A double layer of sheet asbestos, or perhaps a brick, should be placed under the melting pot to prevent heat from being drawn off. Liquids can be heated in the same way. Be careful to have the iron tip tight.—*John Behall, Richmond Hill, N. Y.*



Polishing Small Parts. A tumbling box for polishing small metal parts can be improvised by chucking a tin can in your lathe. A square tobacco can is ideal for this, since it is easily held in a four-jaw chuck. Besides the parts that are to be polished, put some sand and a little kerosene in the can. Use a very slow spindle speed. Finish off with abrasive grains in place of the sand. —*George Morenus, Homer, N. Y.*



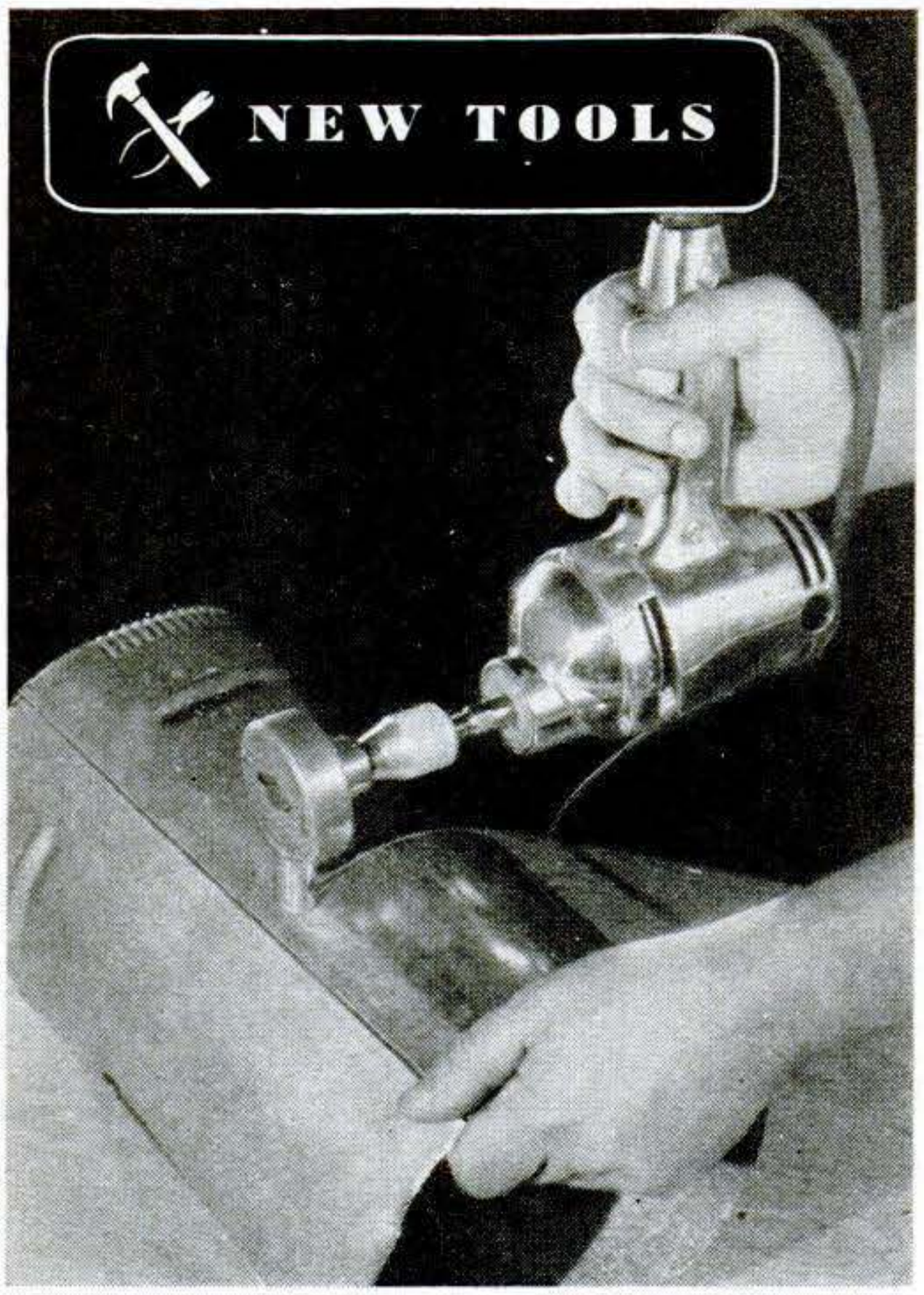
Idler Pulley Adjusts. An adjustable idler pulley can be made by drilling ½″ holes (not intersecting) at right angles to each other through adjacent faces of a 1″ by 1″ by 2″ steel block. In one, drive a piece of ½″ rod and mount a pulley on it. Through the other insert a loose-fitting rod vertically, installing a setscrew to hold it in position. Mount the vertical rod on a flange.—*Frank J. Keller, Philadelphia.*



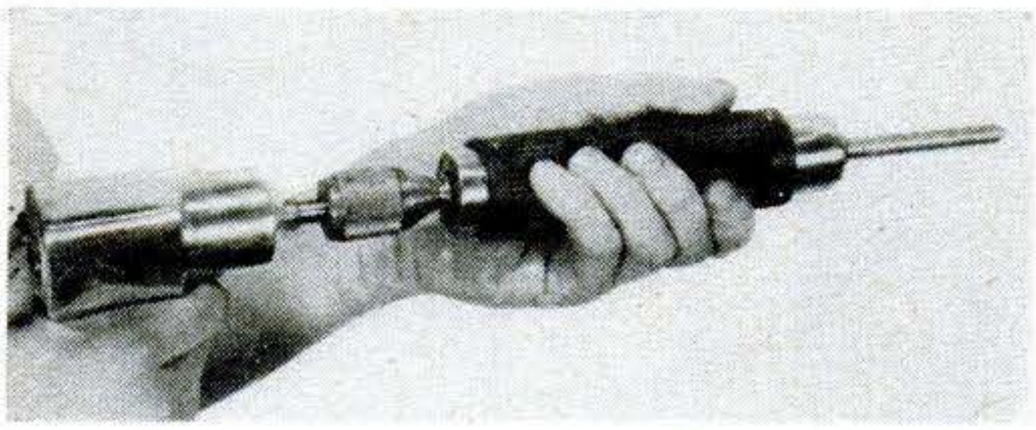
Knife Cuts Sheet Metal. A stubby knife blade tapped with a hammer is a good emergency way of cutting circular openings or other holes in light sheet metal. Pencil the outline of the hole, drive the blade through the metal, and guide it along the line while tapping the blade with a hammer. The photo shows an old paring knife, with its blade shortened to 1¼″, being used to cut a hole in a furnace duct.

Copyrighted material

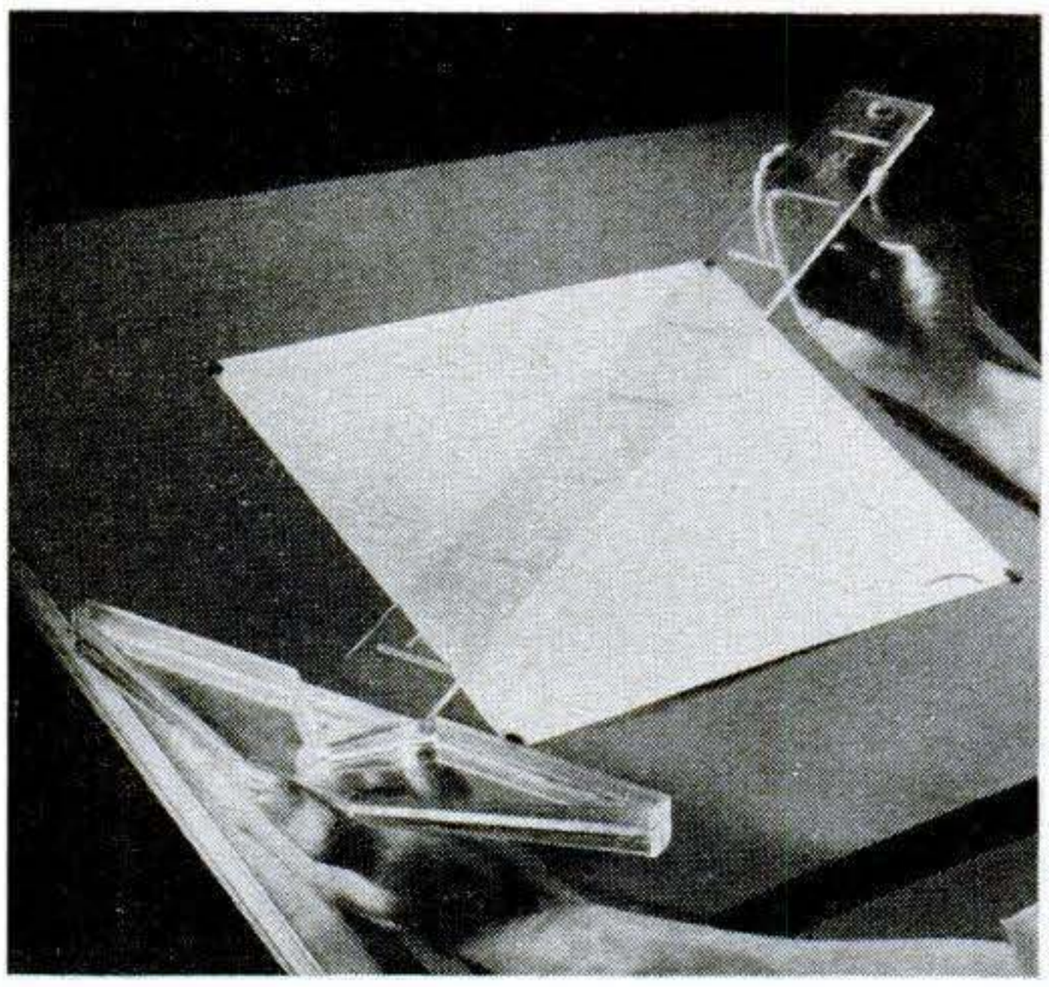
NEW TOOLS



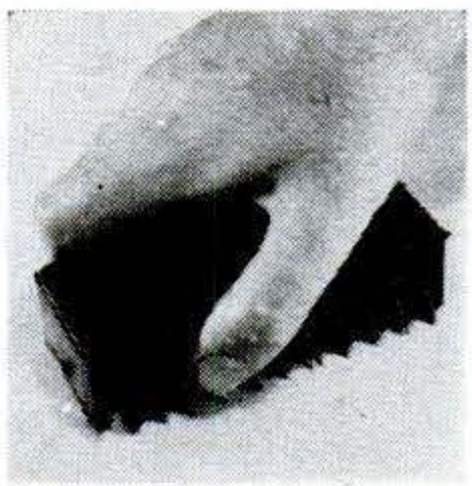
Cuts Sheet Metal. A sheet-metal cutting tool that attaches to any ¼″ electric drill is now produced by the Nord International Corp., of New York. Called the Nibblex®, the attachment is said to be capable of making a circular cut with a radius as small as 1″. It handles any sheet metal up to 20 gauge and is especially handy for a quick job on pipe, as seen above. It also cuts sheet plastic. The compact unit weighs 13 oz.



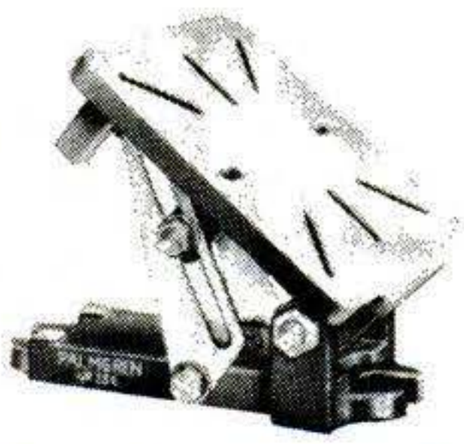
Impact Hammer for Drill. New attachments by which you can convert an electric drill into an impact hammer are now on the market. Above is the Hamer-Dril®, made by Hamer-Dril Company, New York. It chucks in a ¼″ drill and comes with two tool holders that take a wide range of bit sizes. The price is about $22.50. Another attachment is offered by Crandall-York, Inc., Union City, Pa. It attaches to ⅜″ or ½″ drills, takes bits of the same size, and sells for about $10.



T-Square Molded of Plastic. The head and blade of this plastic T-square are molded as one piece. In comparison with T-squares that have the blade screwed to the head, the manufacturer claims that the integral construction guarantees complete accuracy even if the tool is subjected to rough treatment. The clear plastic gives full visibility of the surface on which the T-square is placed. A product of Instrumaster Industries, Chicago, it's offered in 18″ and 24″ blade lengths at about $1.65 and $1.80.

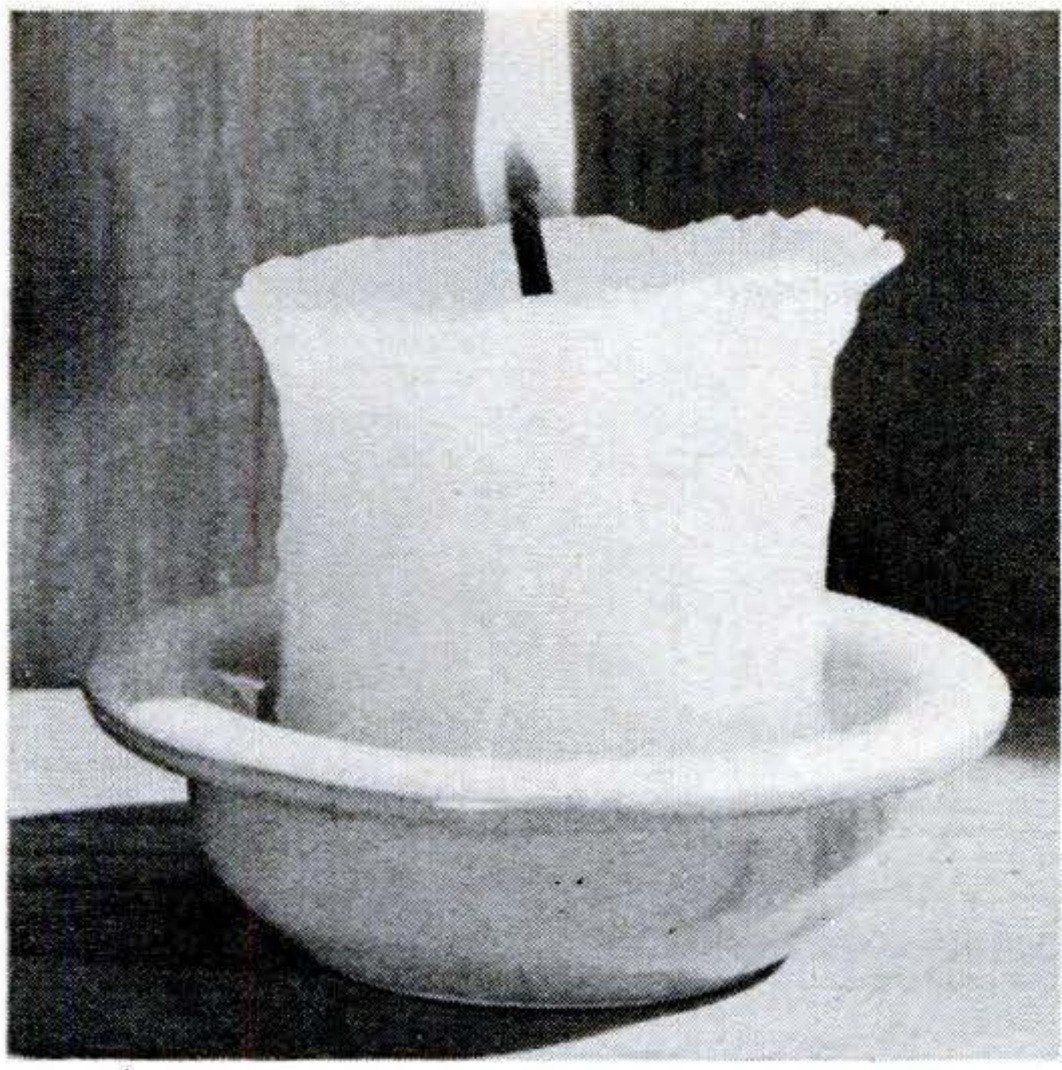


Hand Scraper. This tool is said to plane and smooth both wood and metal. A metal rod running lengthwise through the hard-rubber block holds eleven replaceable steel blades in V-notches. The free-moving blades thus help to clear the tool of clogging scraps. Swiss Laboratory, Cleveland, makes it.



Angle Plate. Adjustable to full 90 deg. and graduated for all angles, an angle plate made by Chicago Tool and Engineering Co., Chicago, can be used for drilling, milling, grinding, and many jobs that ordinarily would require special setups. Eight bolt slots are provided on the surface plate for holding work. The plates come in 6″ by 6″ and 9″ by 9″ sizes.

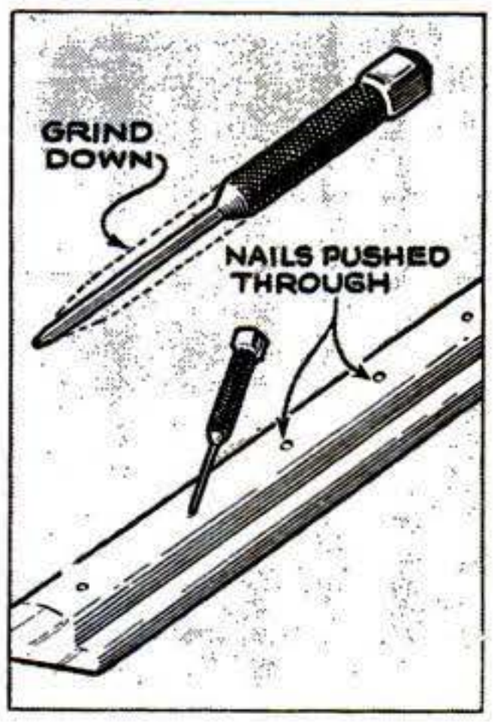
Copyrighted material



Homemade Candles Formed in Metal-Foil Molds

ALUMINUM or other metal foil, such as is used to wrap film, is easily fashioned into molds for candles. A glass may be used as a form to shape the foil. If the foil is backed by paper, fold the metallic surface inside. Stubs of old candles, paraffin from jelly glasses, or any other suitable wax is melted and poured in the mold. Insert the wick while the wax is still molten or make a hole for it with a heated wire after the wax has hardened. To hold the wick in place while the wax is hardening, tie the bottom end to a nail and the other end to a small stick that rests across the top of the mold. When the candle has cooled, peel the foil from it. An interesting surface effect is made by the crinkling of the foil. In the case of short, stubby candles, the foil may be left in place and trimmed with scissors or pinking shears to act as a decoration.

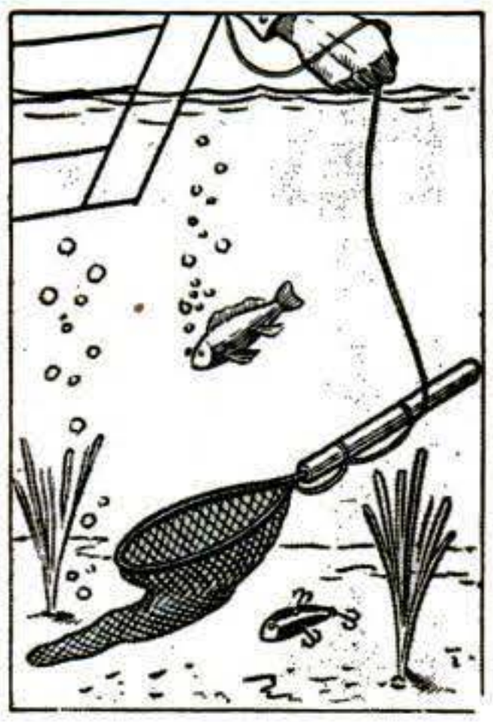
Nail Set Removes Moldings



A PRACTICAL way to remove moldings or quarter round without splitting or damaging them is to push the nails through. A tool for this purpose can be made by grinding down a nail set as shown in the drawing at left.—*Victor H. Lamoy, Upper Jay, N. Y.*

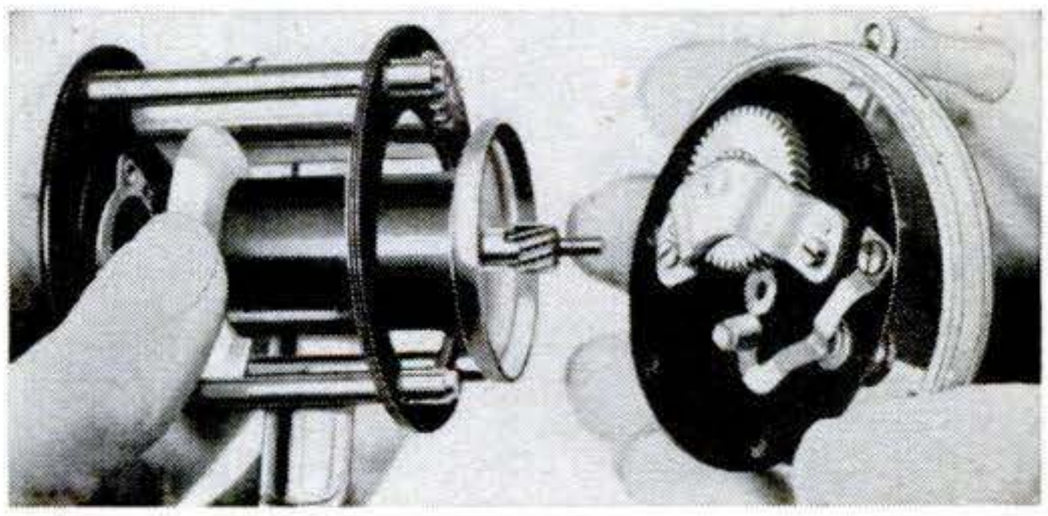
Net Locates Lost Lures

IF YOU lose a valuable fishing lure overboard, tie a stout line to your dip net and use it as a drag. The net, dragging over the hooks, will often become entangled with them. The lure then can be hauled to the surface.—*G. E. Hendrickson, Argyle, Wis.*

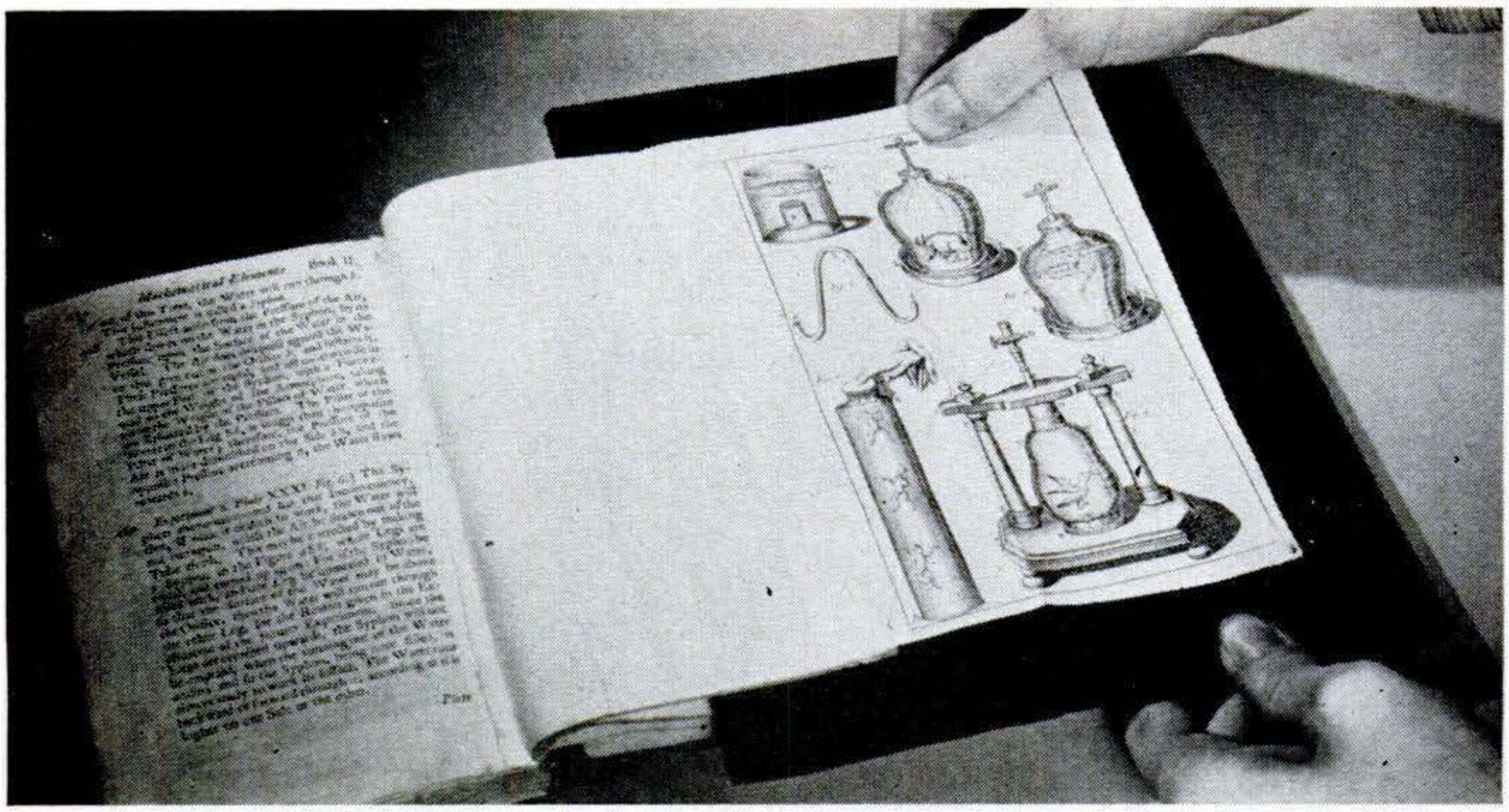


Reel Head Can Be Removed by Hand for Cleaning

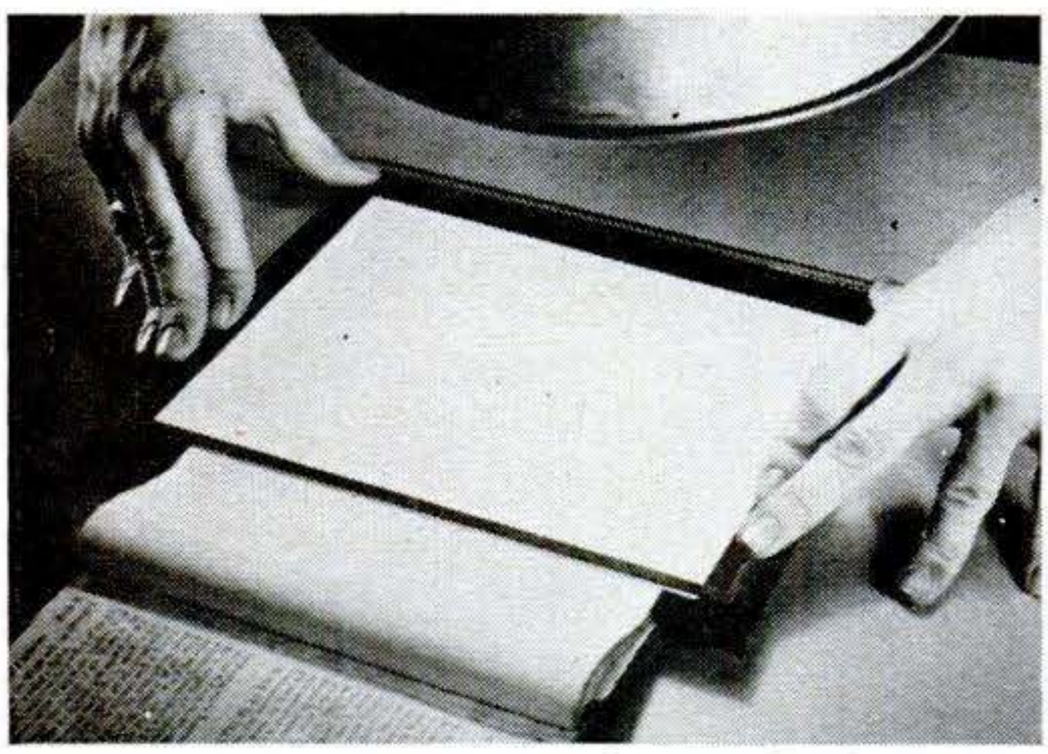
NO TOOLS are necessary to remove the head of the Heddon Pal Reel®, making it easier for a fisherman to brush the mechanism with solvent and apply clean oil. The frame may be left attached to the reel seat while the head is removed. The maker, James Heddon's Sons, of Dowagiac, Mich., says the construction prevents the loss of small parts while removing the reel head.



Copyrighted material



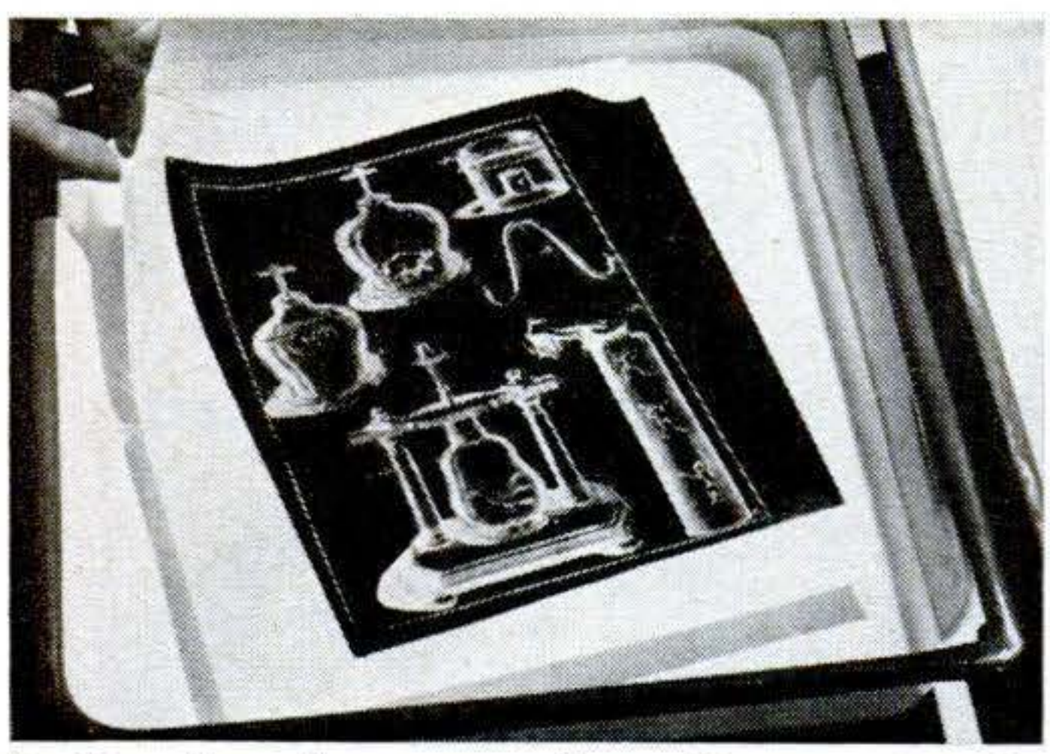
1. Back original with black to prevent anything on reverse side from printing through. Plywood covered with black felt is excellent for this. Heavy black paper can also be used.



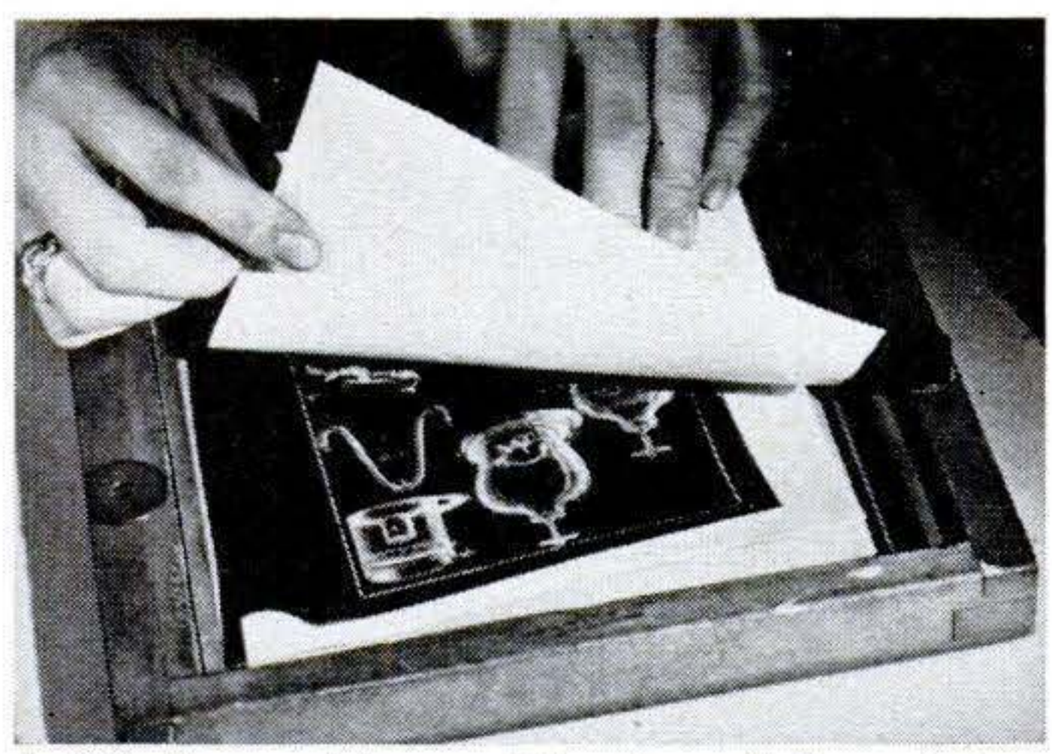
2. Put reflex paper, emulsion side down, on top of the face-up original. Cover with glass and press down while exposing to 100-watt bulb. Use a safelight while handling paper.

Copying Without a Camera

By Kenneth M. Swezey



3. Develop the paper about 30 sec., rinse in short stop, fix 10 min. in hypo, wash 30 min., and dry well. You then have a white on black negative. Note it's reversed left to right.



4. Black on white positive is made by printing through back of negative. Put it face down on sheet of face-up reflex paper on the backing board, or assemble in printing frame as above.

Copyrighted material

REFLEX printing is a handy photographic process to know even though you have no interest in photography as a hobby. With it, you can make quick copies of such things as letters, drawings, or text matter and diagrams in books and magazines.

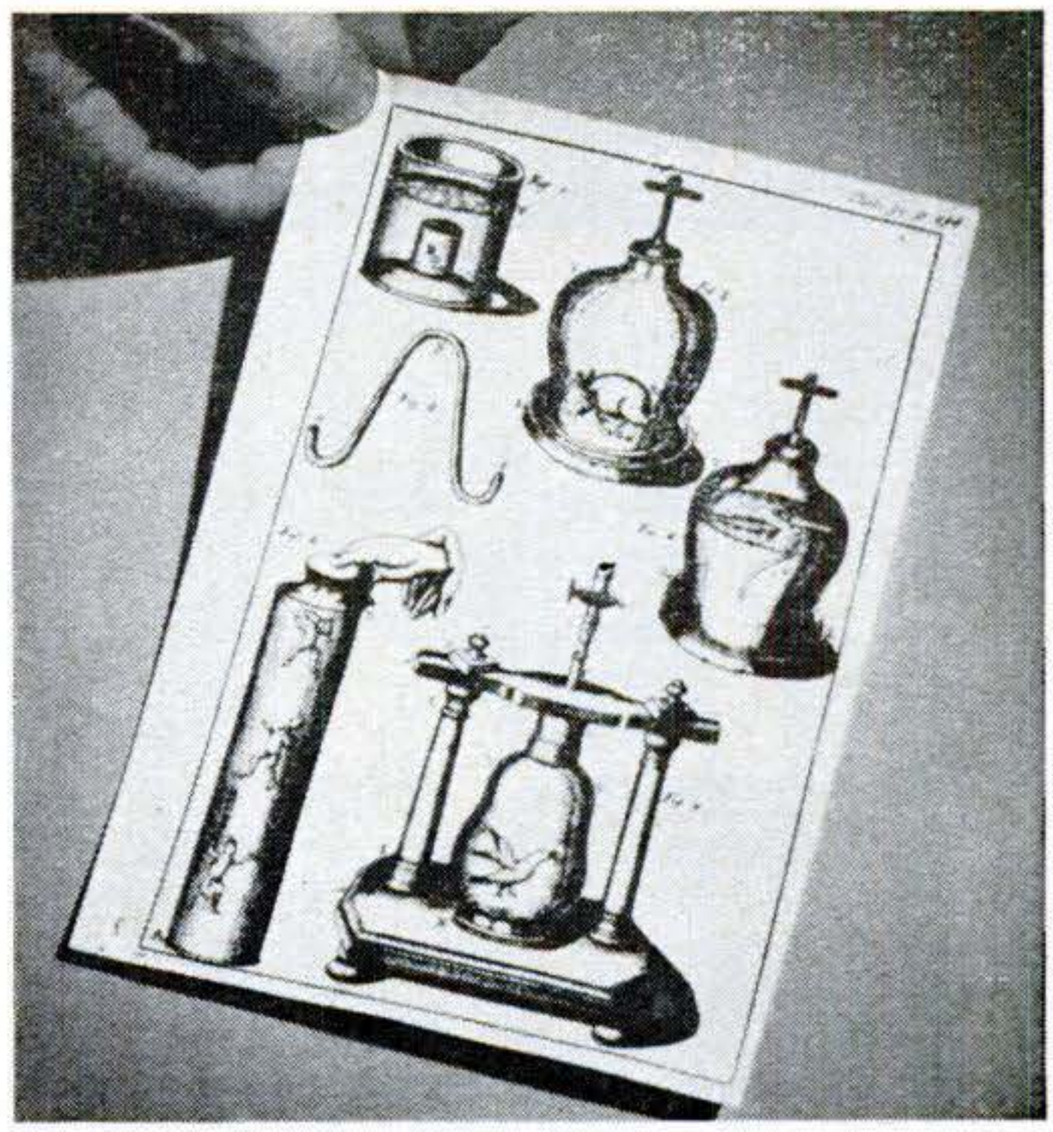
No camera is required. The main thing is a package of special reflex paper. This paper is thin and of high contrast. A sheet of plate glass, a felt-faced piece of plywood, and ordinary developer, short stop, and hypo complete your needs.

The job must be done under darkroom conditions. A yellow-green safelight may be used. You can probably get by with a dim red or orange bulb.

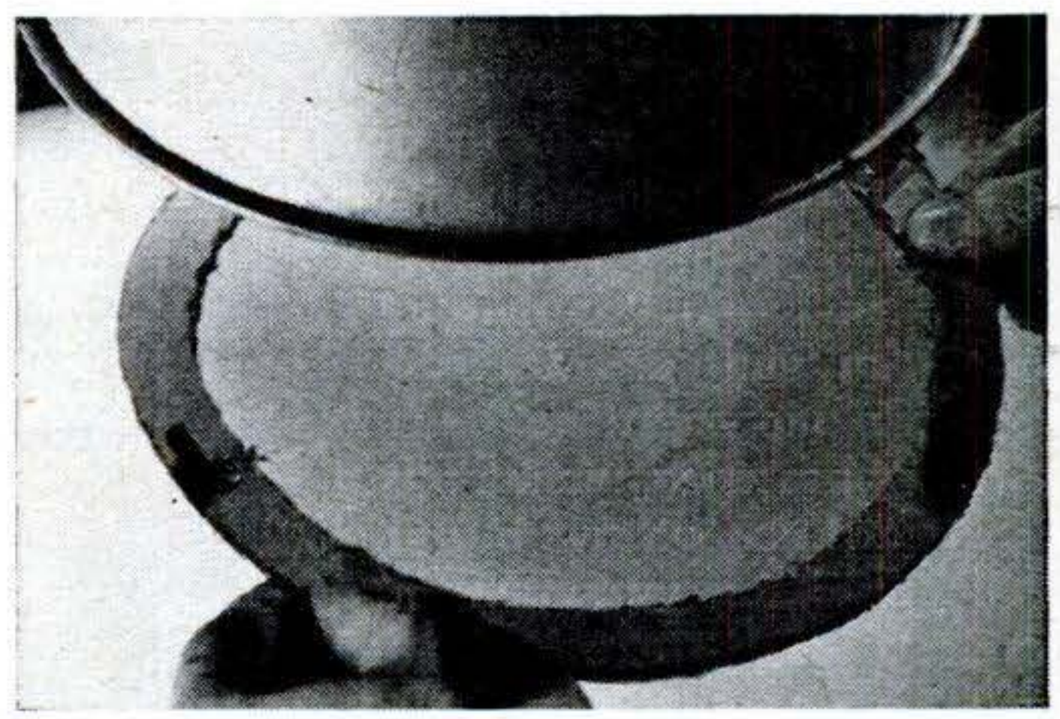
If what you want to copy is on thick or opaque paper, or has printing on the reverse side, you must first make a negative by the reflex method. For this, the original is placed face up with a sheet of reflex paper on it emulsion side down. Light thrown on the back of the reflex paper passes through and bounces back in proportion to the lightness of each area on the original.

For sharp definition, the original must be held firmly and evenly in contact with the paper. If there's any printing or design on the reverse of the original, it must be backed with black.

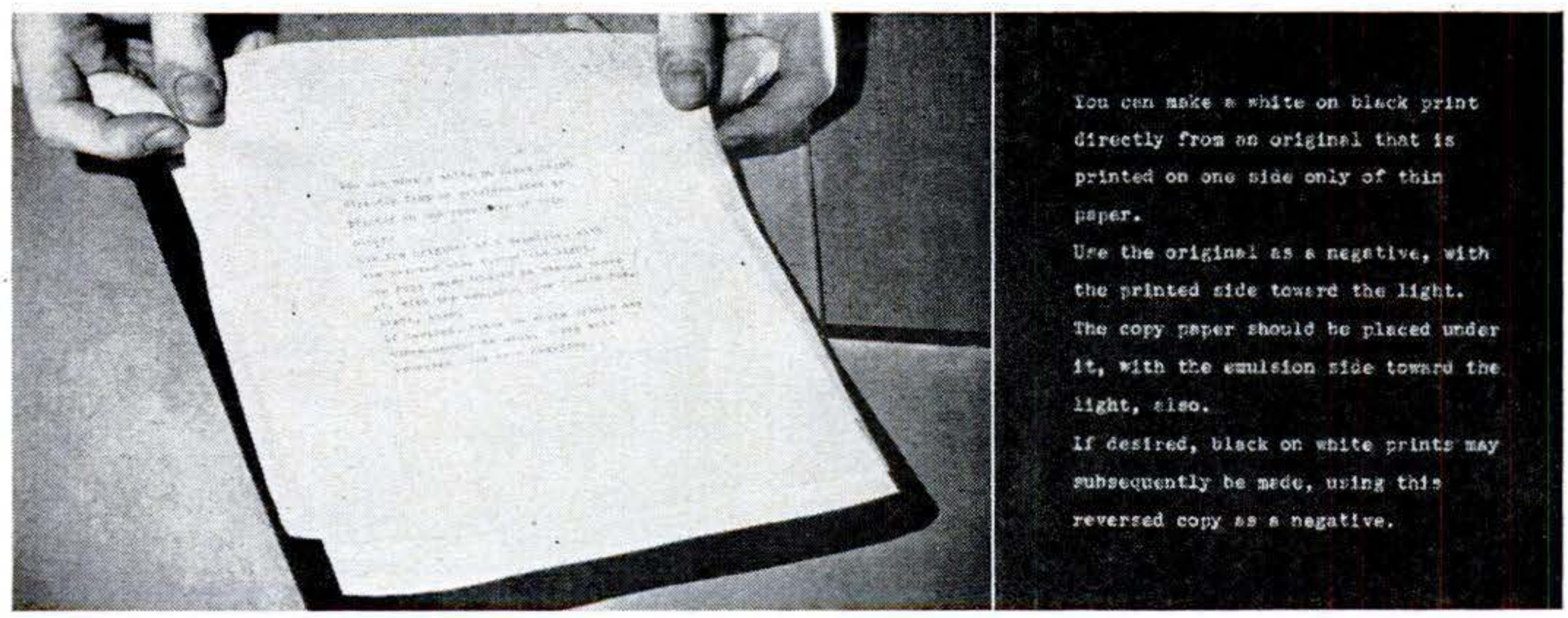
Make the exposure with a 100-watt bulb suspended above the paper. Exposure varies according to the bulb-to-paper distance and the nature of the original. After exposure, develop the paper for about 30 sec. at 68 deg. F. in a standard developer such as D-72 or Dektol®, diluted 1 part water to 1 part stock developer. Rinse, fix, wash, and dry. The result is a negative. To make a positive, use this as you would a film negative.



5. A contrasty copy of the original results. This positive is exposed and developed in the same way as the negative, but you may need a different exposure. A test strip will tell.



6. Use a yellow filter in front of exposure light if copying a blueprint or original that has blue ink. Yellow cellulose film glued to cardboard ring as above does the trick nicely.

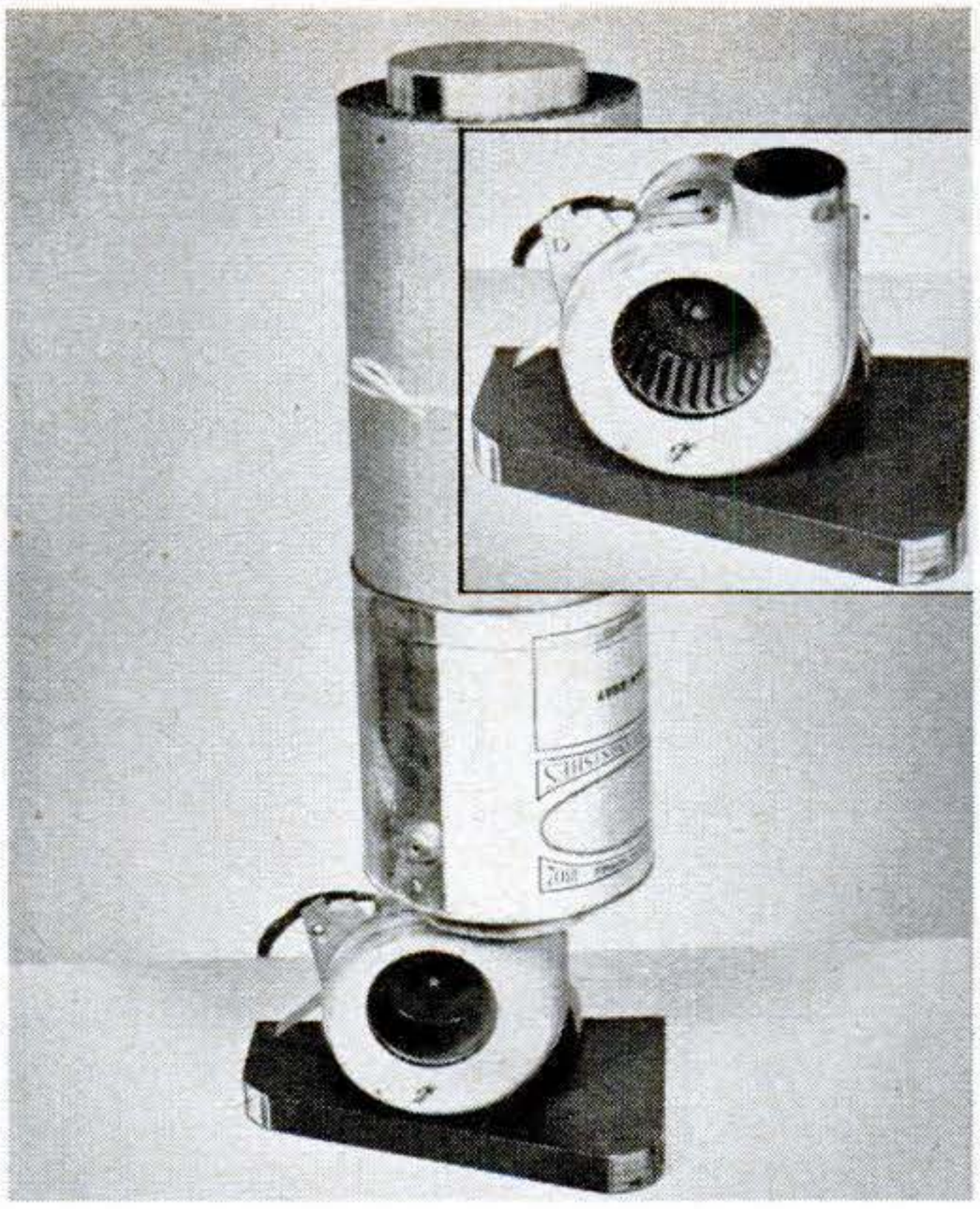


If white on black copy will serve, you can use original as negative if it's printed on one side only of thin paper. In this case, the original and photographic paper must both face the light.

Copyrighted material

PHOTO IDEAS AND EQUIPMENT

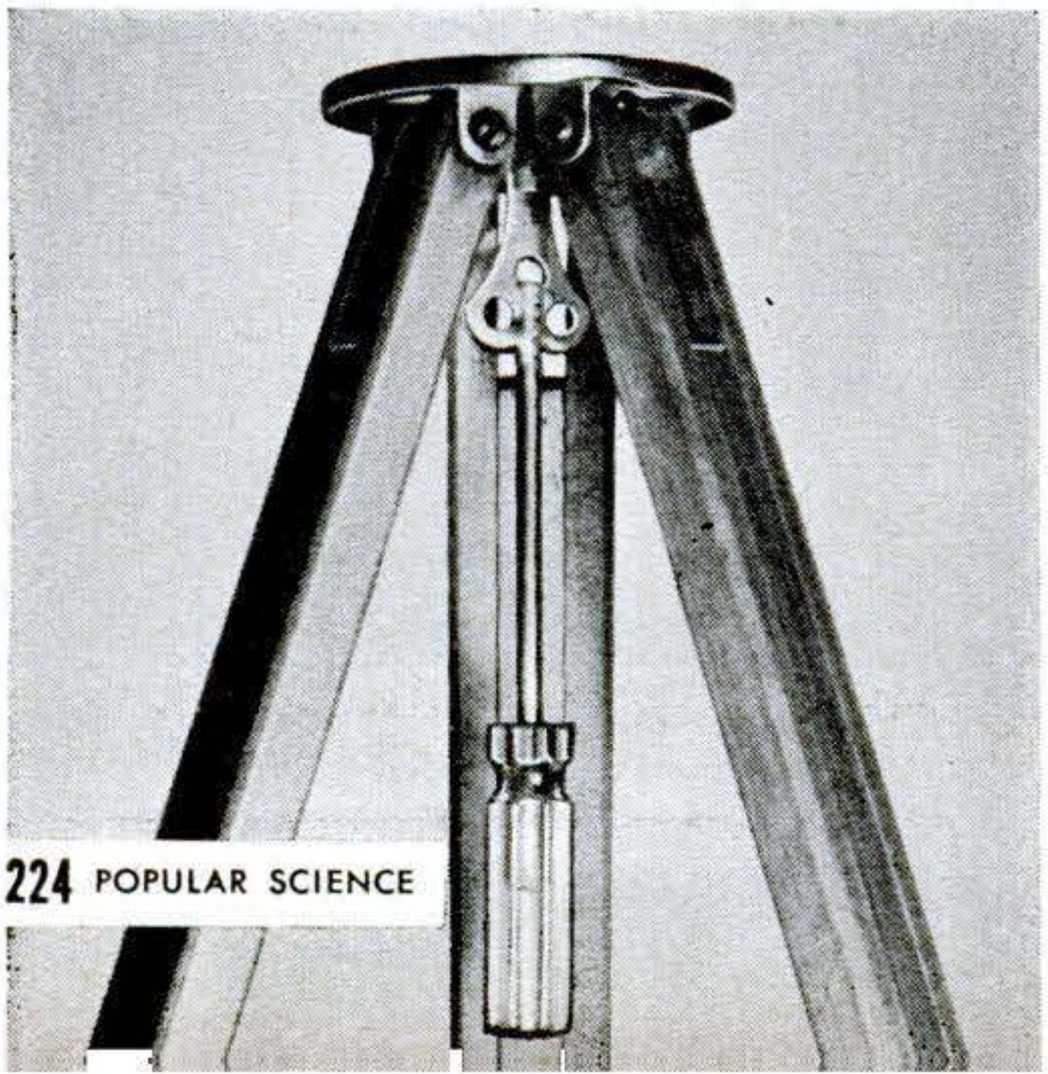
Condenser Improves Flash. The new Jen-Flash® above, made by the Jen-Products Company, New York, consists of a small capacitor and a hearing-aid battery. A charge stored up in the capacitor when a bulb is inserted makes it possible to use as many as four lamps without booster batteries. The current surge also gives foolproof firing even though the battery may be weak. The unit weighs only 8 oz.

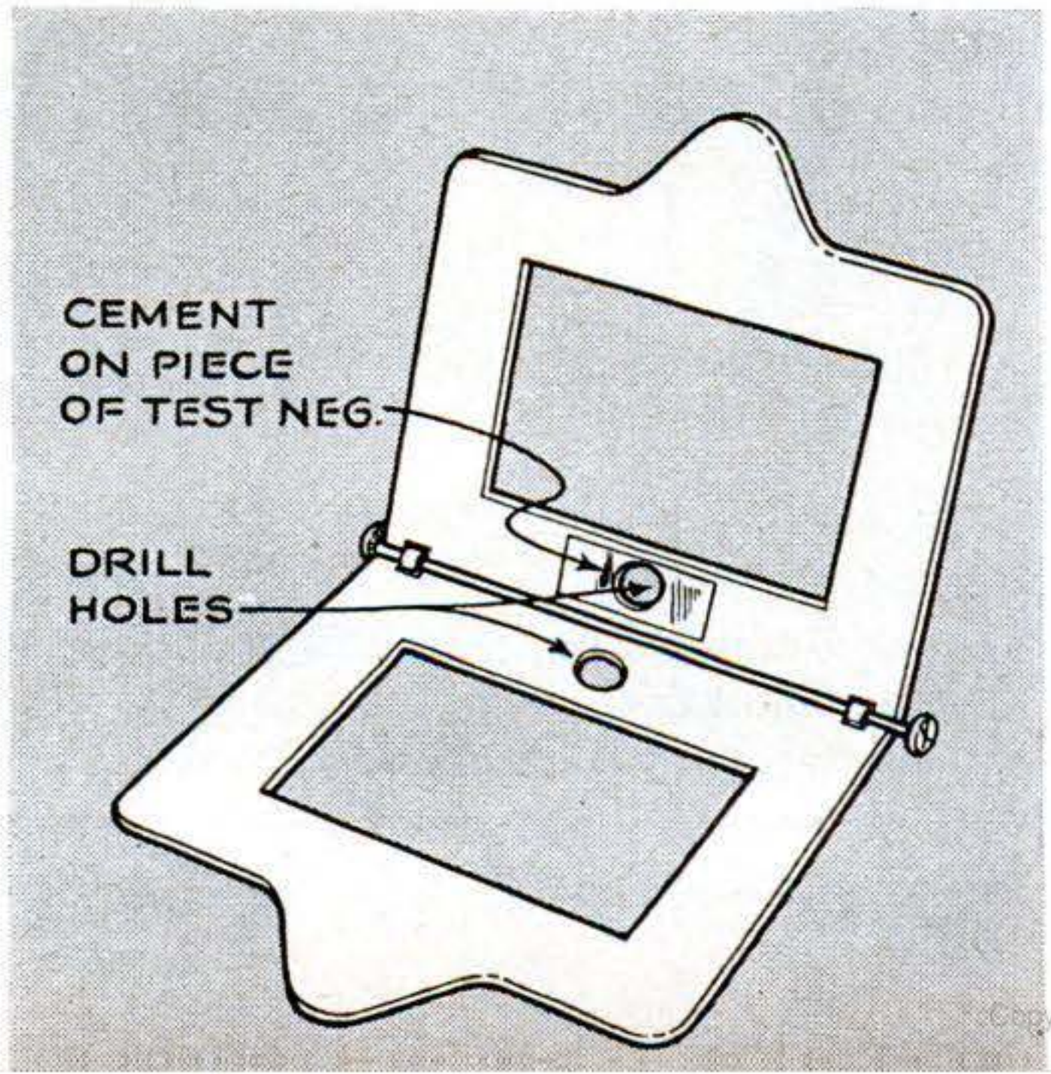


Blower Dries Prints. I've found this method of drying prints in a blotter roll very successful. A blower is mounted with the nozzle upright. One end was cut from a 1-gal. can and a nozzle-size hole cut in the other. This end is screwed to a wood doughnut that fits tightly over the nozzle. Wires across the can support the blotter roll. A wood disk closes the top center. —*Carl W. Thompson, Jr., New Castle, Del.*

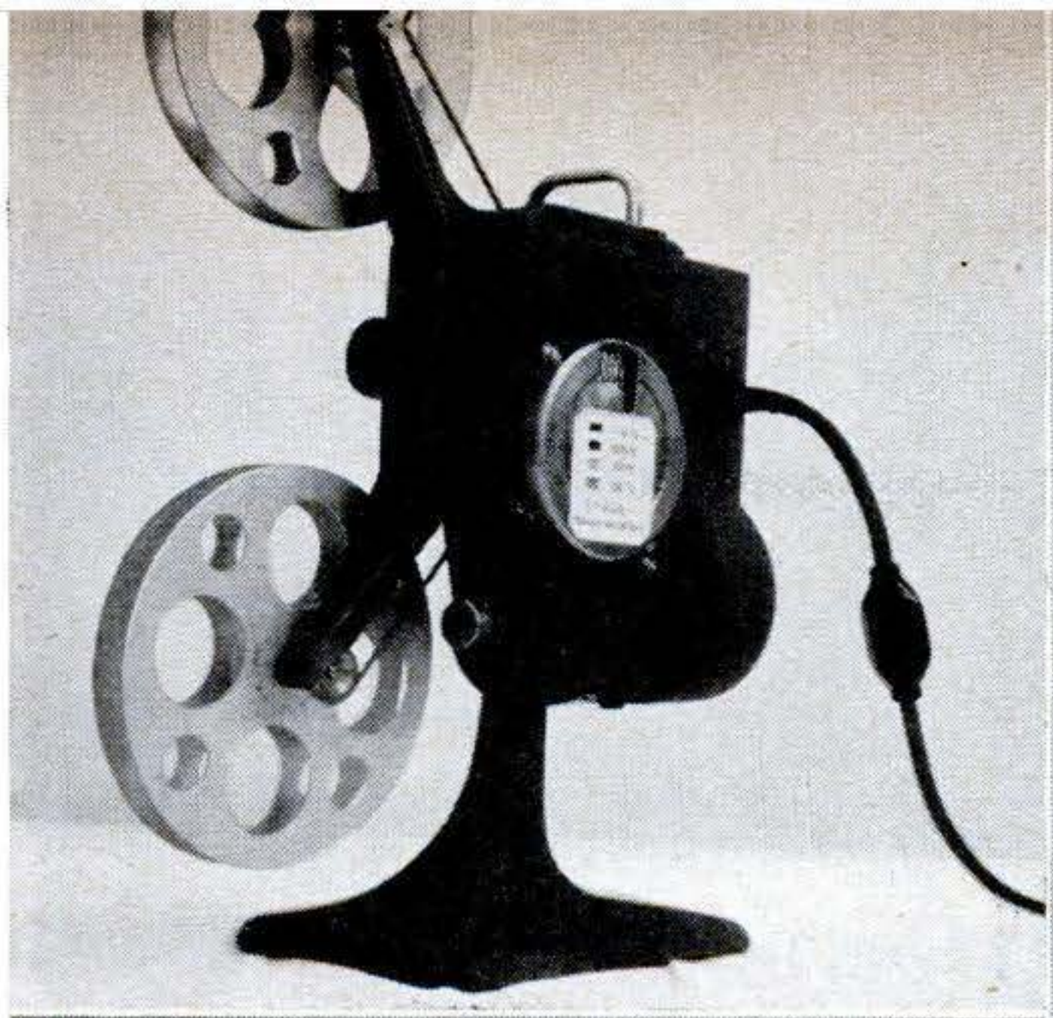
Handle for Tripod Screw. An extension handle for the screw on an old-type tripod can be made from a 6″ screwdriver. Soften the end of the blade by heating and letting cool slowly. Then saw off the tip and cut a slot about ½″ deep. Slip this over the screw key and solder in place.—*A. Trauffer, Council Bluffs, Iowa.*

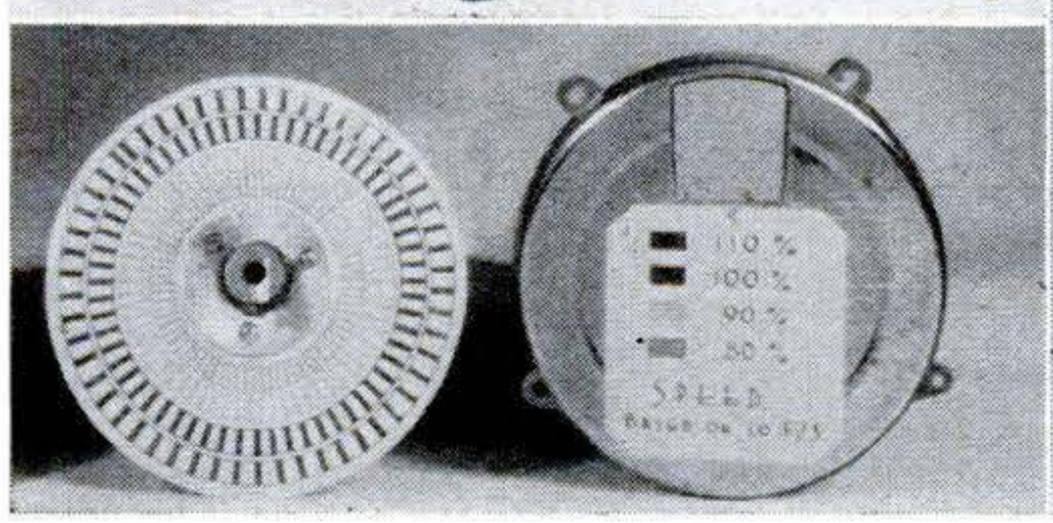
Test Negative Aids Focusing. A dense negative is always difficult to get into sharp focus on the easel. A piece of thin, sharp negative cemented over one of two holes drilled in the carrier overcomes the difficulty. Pull out the carrier until the spot appears. Focus on this. Then push back carrier.—*Hugh Lineback, Stillwater, Okla.*

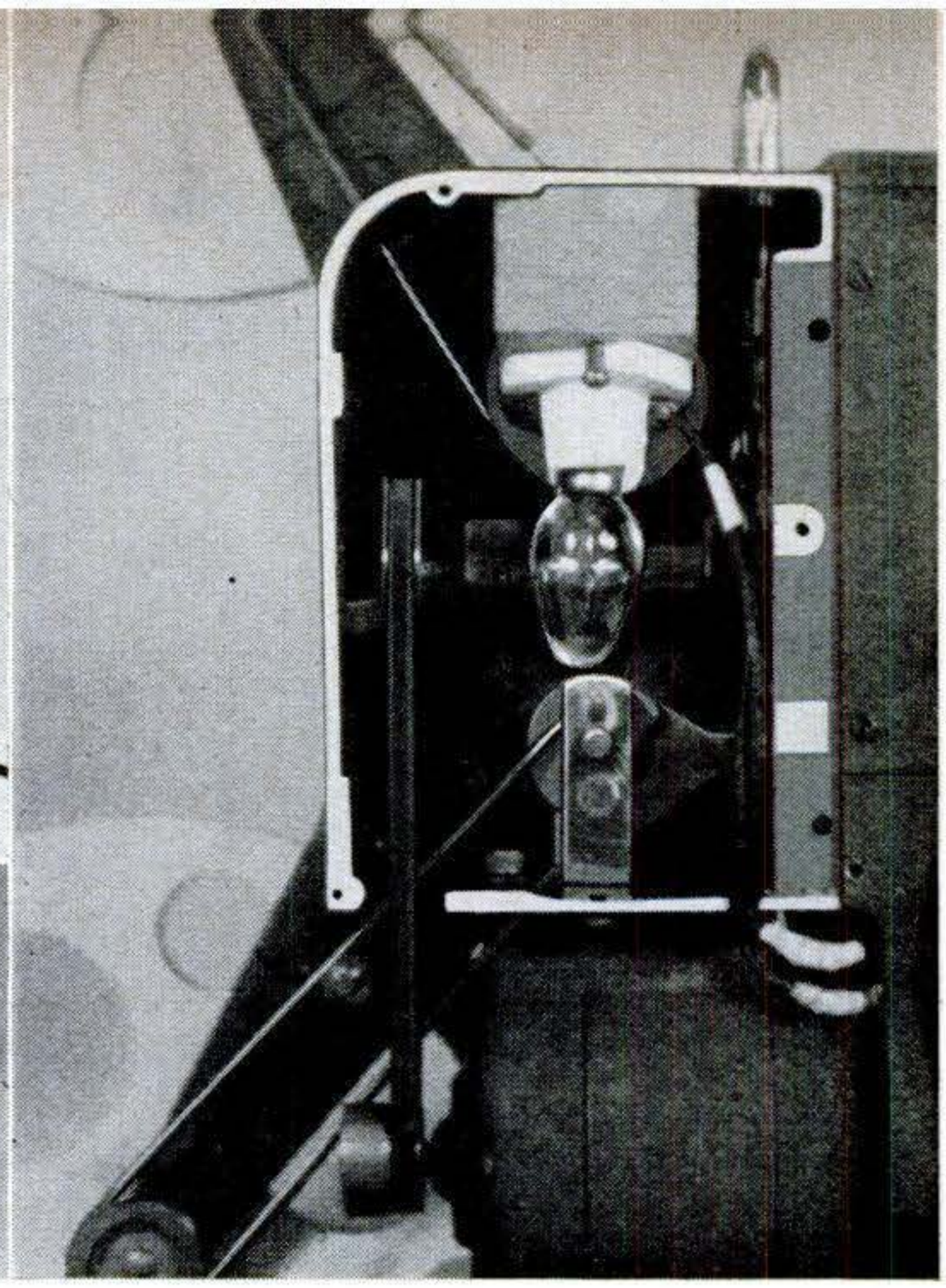




Copyrighted material





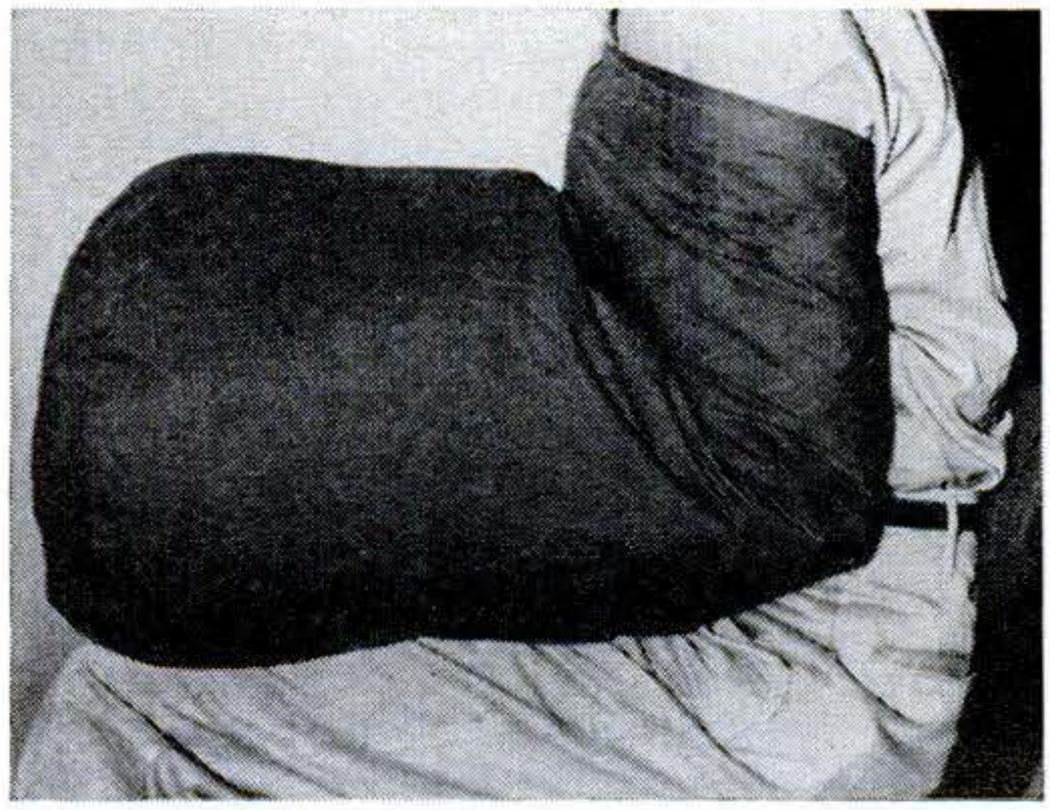


Speed Set with Stroboscope. A stroboscope is used in the General Engineering Laboratory at Iowa State College to show movies at controlled speeds. Above is a projector with stroboscope attached.

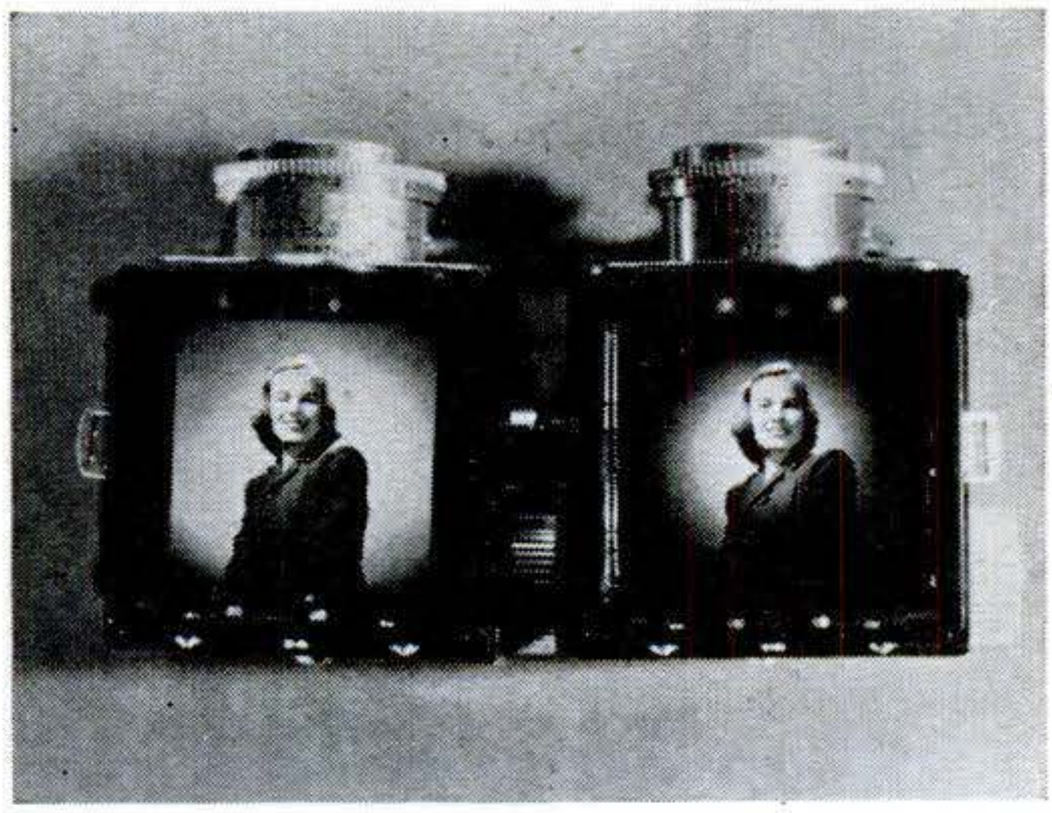
The 4″ stroboscopic dial, made of translucent paper, has four circles of radial lines. Beginning with the outer circle, the speeds are 110 percent of normal, 100 percent, 90 percent, and 80 percent. Each circle of lines is a different color. Spacing of the lines was determined by dividing the light peaks per second (120 for 60-cycle power) by speed of the sprocket shaft per second.

The dial is attached to an extension of the lower sprocket-wheel spindle. A neon lamp (see above) is mounted inside the projector back of the opening in the dial cover. A rheostat controls the speed of the motor.—*L. D. Henry, Ames, Iowa.*

Films Loaded in Army Bags. Two of the waterproof clothing bags now sold at war-surplus stores provide an inexpensive means of loading or unloading film holders. Fit one inside the other to avoid any chance of a light leak. Pull the top up under your armpits and lean forward while working.—*Tom Riley, Portland, Ore.*

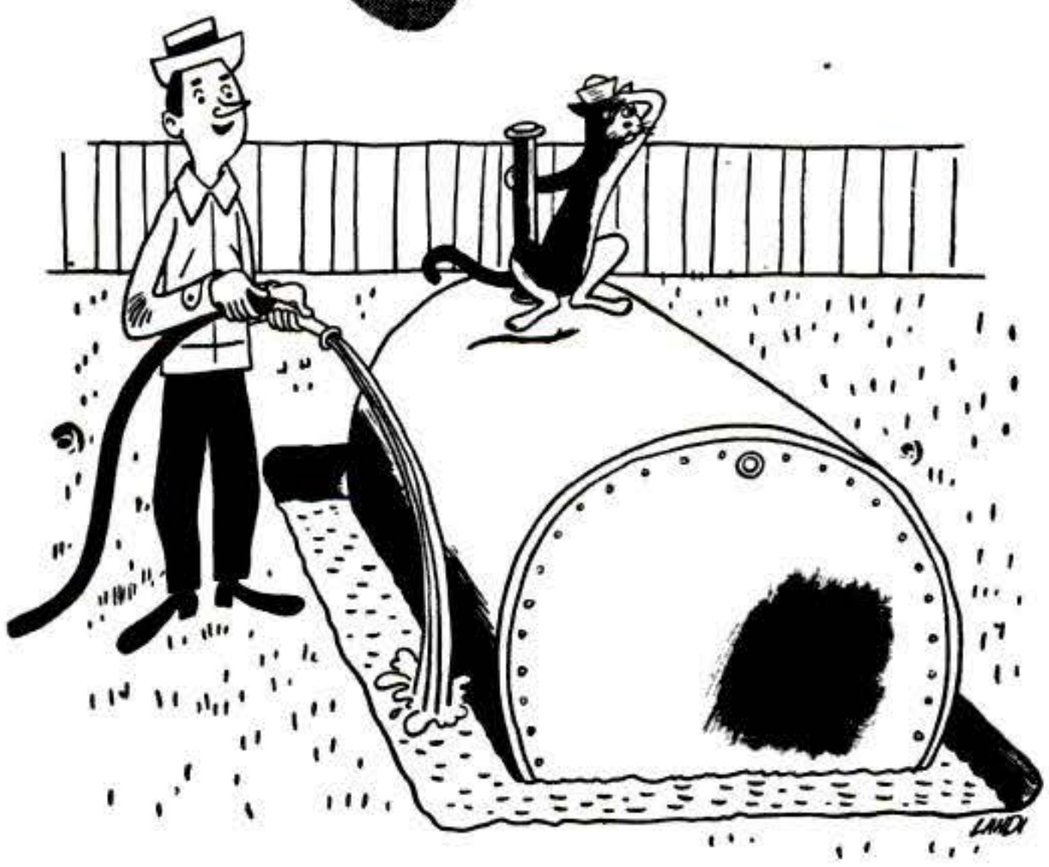


Viewing Lens Improved. You get a clearer view of your subject on the ground glass of the Kodak Reflex II. Beneath the ground glass is an Ektalite Field Lens®. Made of plastic, this new type of lens more than doubles the overall illumination on the glass. Below are comparisons of the new (left) and the old.



Copyrighted material

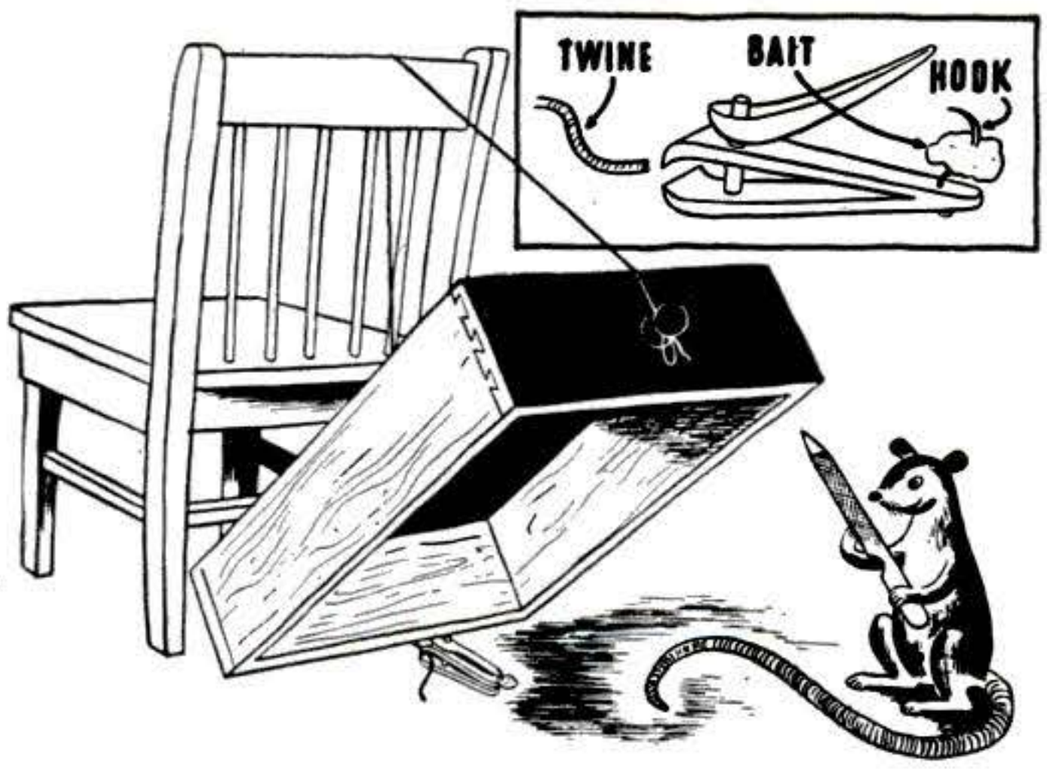
What's Your Ingenuity Quotient?



After digging all around a big storage tank that I wanted to remove, I found the soil underneath so pressure packed that I couldn't budge it. By then I was ready to blast the tank out except that I wanted it undamaged and I didn't have any dynamite anyway. So I filled up the pit with water. This not only loosened the soil but floated the tank to the top.—*Victor H. Lamoy, Upper Jay, N. Y.*

I was stuck but good. I had torn down the rocker arms, tappets, and push rods on my car. After cleaning up the parts, I put them back and started looking around for my .015″ feeler gauge. I couldn't find it anywhere, and it was a Sunday, with all shops closed. Then one of my wife's old corsets came to mind. Using a micrometer, I picked out a steel stay that measured .015″. That did it.—*Peter Crispino, Brooklyn, N. Y.*

A leak in my 900′ pipe line could have meant a lot of digging since no water showed above ground. Just a pressure drop at the house. Instead of all that spade work, I capped the line at the spring and at the house. At the house I fitted an inner-tube valve in the plug and hooked my air compressor to the valve. Then I walked along the line. When I heard a bubbling sound, I had the leak.—*G. M. Small, So. Windham, Me.*



We had a smart-aleck rat. He must have trained in a rat-trap factory, since he knew all about ordinary traps and steered clear of them. However, I devised this snare that put an end to Smarty's activity. A wire hook both held the bait and also kept the nail clipper lightly closed on the twine. When the rat took the bait, he released the clipper and dropped the drawer on himself. —*Bruno Dias Souza, New Goa, India.*

Have you pulled off a smart one lately? We will pay for acceptable contributions showing ingenious solutions of problems in the home, shop, garage, or camp. It doesn't matter if it's wacky—if it works. Use government postcards only. Contributions cannot be acknowledged or returned.

Copyrighted material

4-Way Portable Stretches Battery Life

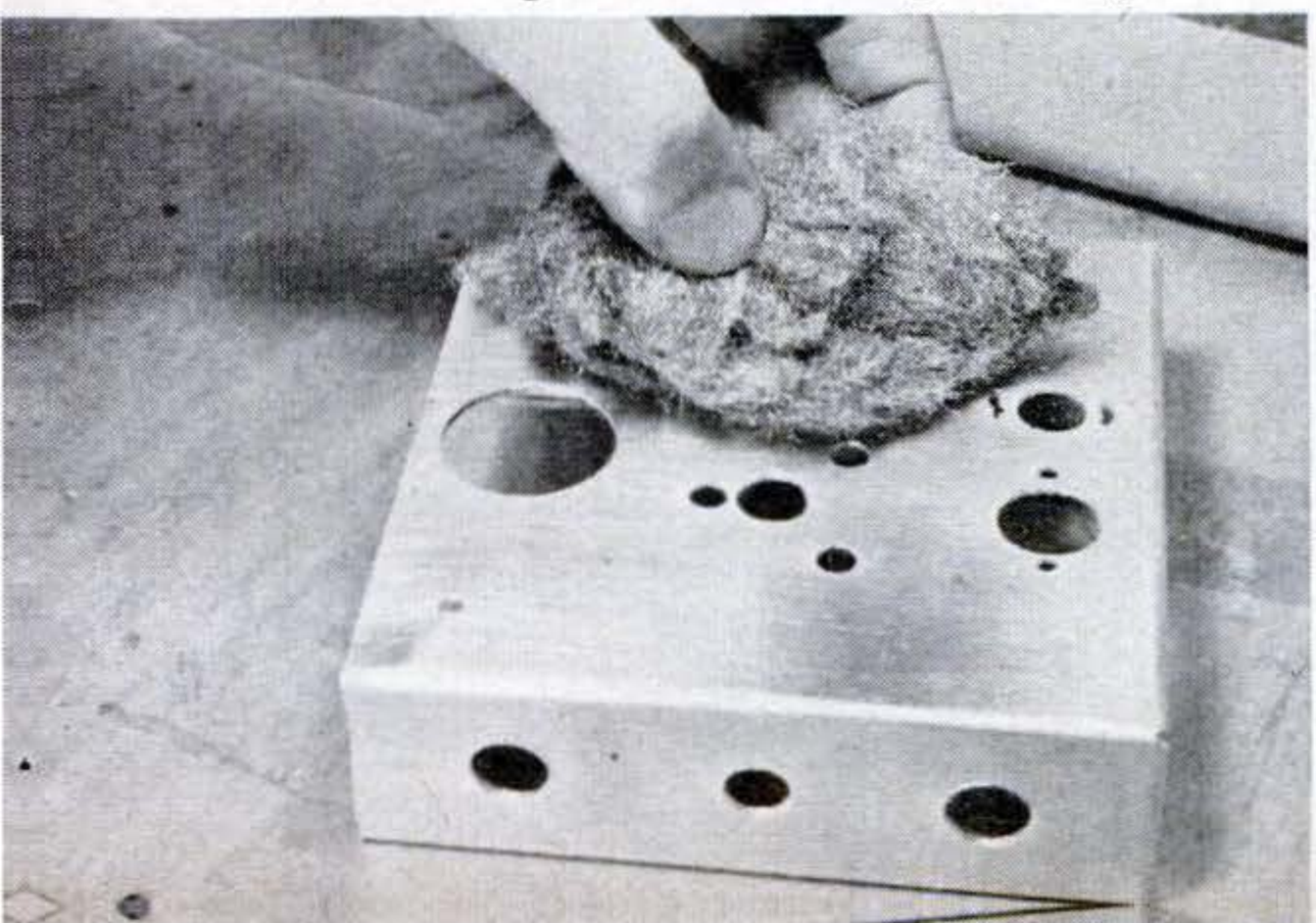
Getting ready for summer afternoons? A radio is almost as important as sunshine and water.

High and low battery positions as well as AC and DC operation give this versatile set surprising economy.

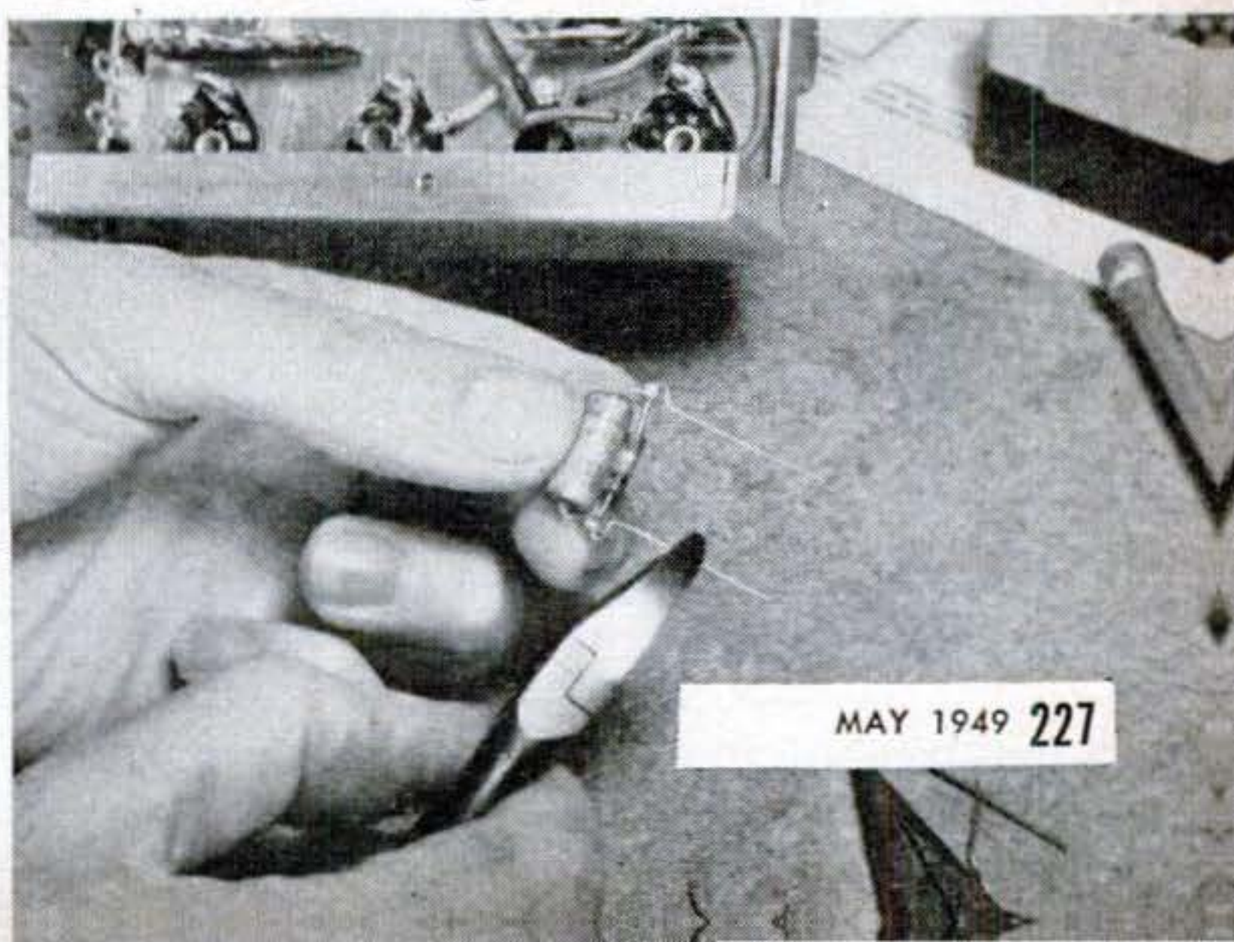
By Henry C. Martin

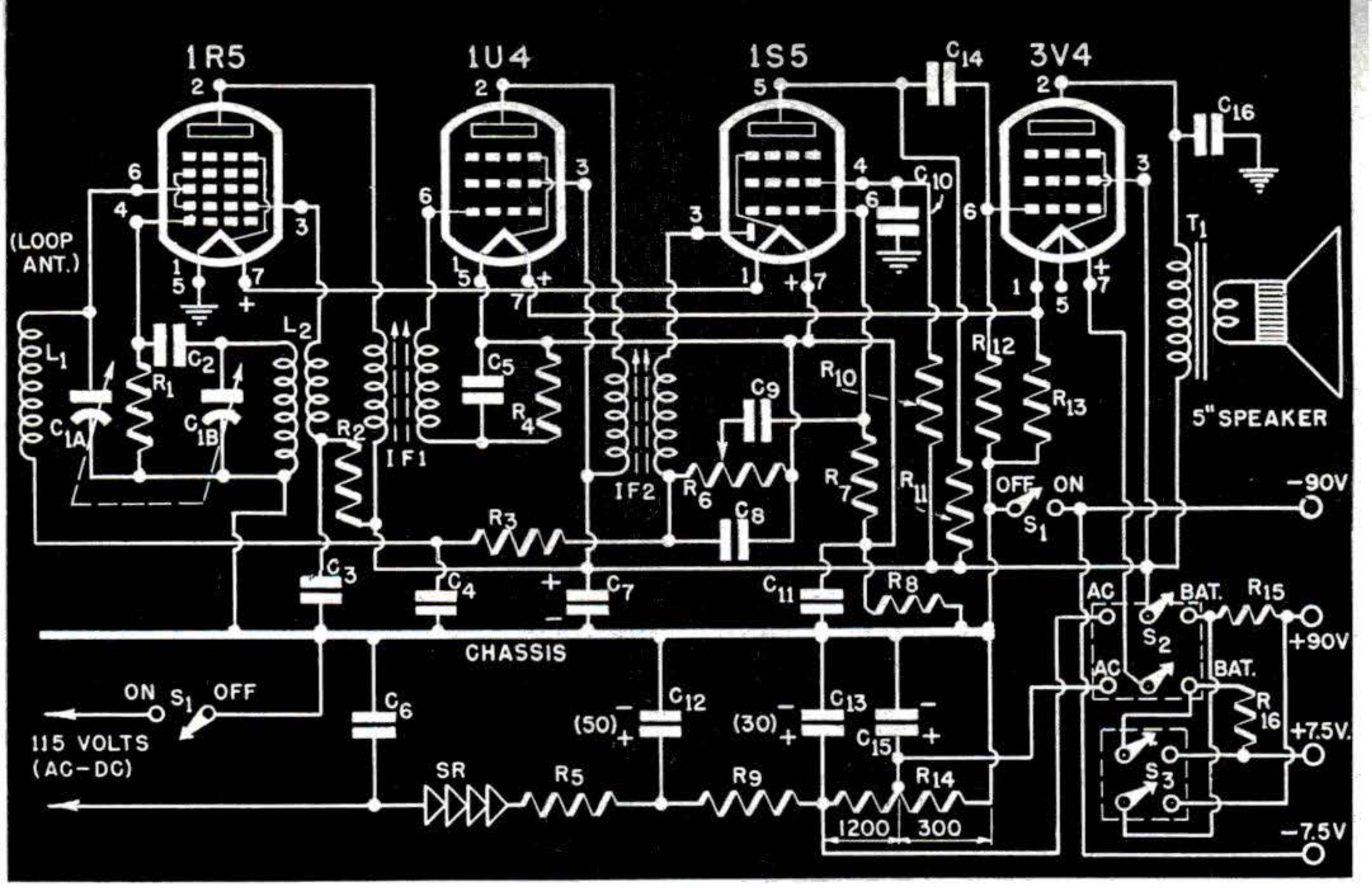
TWO resistors can make a big difference in a radio circuit. In the little set pictured here, they make a whopping difference in economy and battery life. You've seen standard three-way portables that operate on 90 volts of B battery or from an AC or

Plan the parts layout and drill the necessary holes. Rub down the chassis with steel wool to clean it up and smooth rough-cut edges.



Save space by joining small parts that go together—such as condensers and resistors in parallel—before soldering them into the set.





LIST OF PARTS

All resistors ½-watt carbon unless otherwise specified.
R1: 50,000 ohms.
R2: 6,800 ohms.
R3, R12: 2.2 meg.
R4, R7: 10 meg.
R5: 50-ohm, 10-watt wire-wound.
R6: ½ meg. potentiometer (volume control).
R8: 2,200 ohms.
R9: 200-ohm, 10-watt wire-wound.
R10: 3 meg.
R11: 1 meg.
R13: 150 ohms.
R14: 1,500-ohm, 25-watt adjustable wire-wound.
R15: 2,500 ohms.
R16: 20 ohms.
C1 A, B: Two-gang tuning condenser with cut-plate section for 455 kc. IF.
C2: 50-mmf. mica or ceramic.
C3, C5, C6, C9, C10, C11, C14: .01-mfd., 200-volt midget paper.
C4: .05-mfd., 200-volt midget paper.
C7: 20-mfd., 150-volt electrolytic.
C8: 100-mmf. mica.
C12, C13: 50-30-mfd., 150-volt dual electrolytic.
C15: 100-mfd., 50-volt electrolytic.
C16: .01-mfd., 200-volt midget paper.
S1: DPST switch on R6.
S2: DPDT toggle.
S3: DPST toggle.
T1: Midget output trans. (see text).
SR: 100-ma. selenium rectifier.
L1: Loop antenna.
L2: Air-core osc. coil.
IF1, IF2: Iron-core intermediate-frequency transformers.
Batteries (90 volts B; 7½ volts A), 5" PM speaker, tubes, sockets, cabinet, back panel, chassis, dial, line cord and plug.

DC line. Another common design is the "personal" radio that generally uses a 67½-volt battery to save space. Compactness is achieved, but at the cost of lowered sensitivity and volume.

Here, for the first time, both circuits are incorporated in one set. Indoors you'll run this receiver off the house lines. When you get out of range of an extension cord, however, you'll find that packaged power not only delivers the goods but does so at a considerable saving.

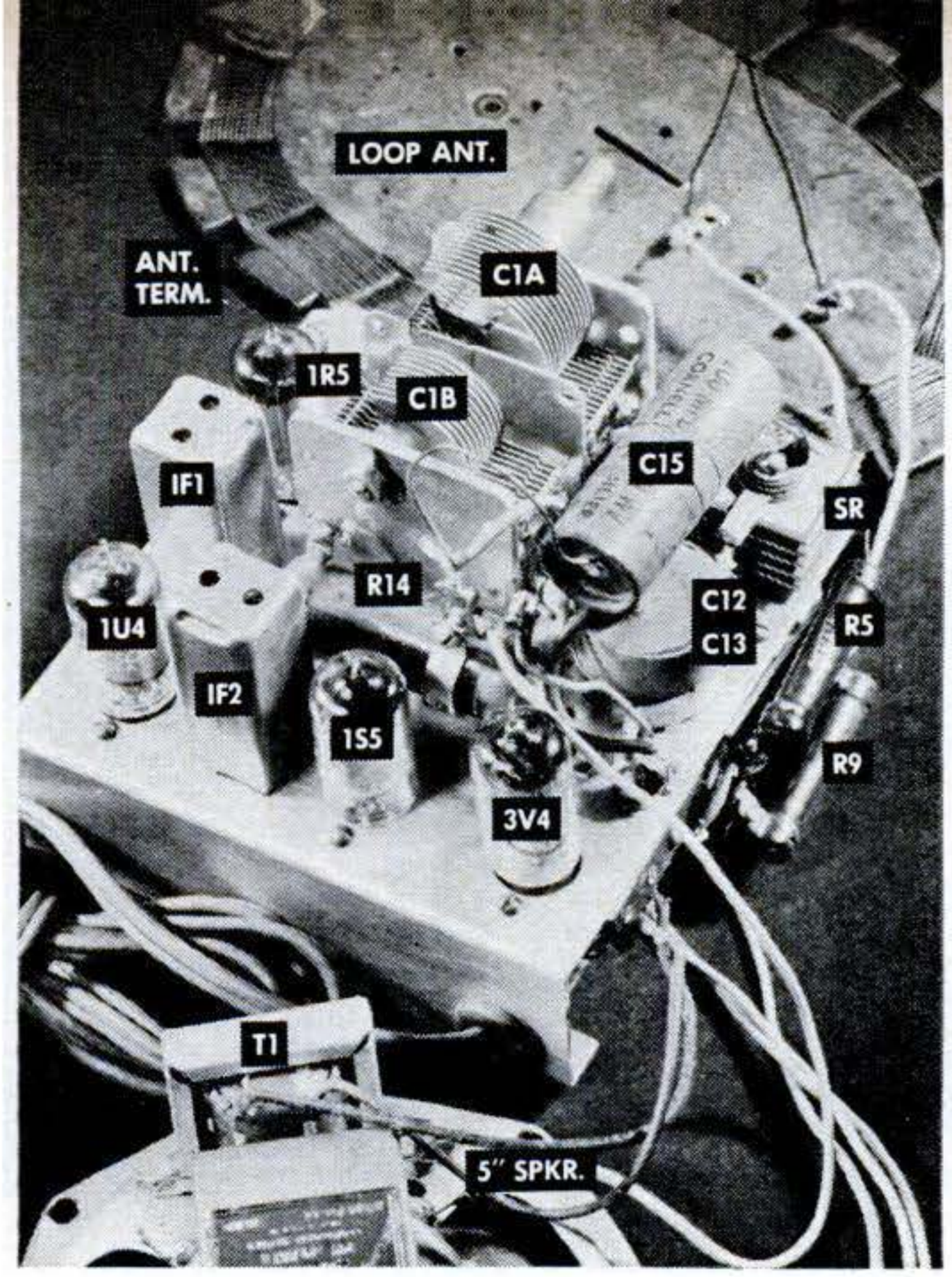
The whole trick is in the addition of two dropping resistors and an economy switch. Using 90 volts of B battery and 7½ volts of A, the receiver performs with maximum sensitivity and volume. That's fine for a noisy beach or ball park, or when you want to listen to a far-off station. But most of the time you can get away with less power without noticing the difference. Flicking a switch reduces the potential from 90 volts to about 60, and from 7½ volts to 6. Current drain from the B battery is cut from 18 milliamperes to 7, while A current goes down from 55 to 45 milliamperes.

All of this means long, long battery life, for even after the cells have run down by a third, the set will continue to give first-rate performance if the economy switch is set up to maximum. To reduce battery drain, R15, a 2,500-ohm resistor is inserted in the B-plus line, and R16, a 20-ohm unit, is placed in the filament lead. When full power is needed, the DPST switch, S3, shorts out the dropping resistors.

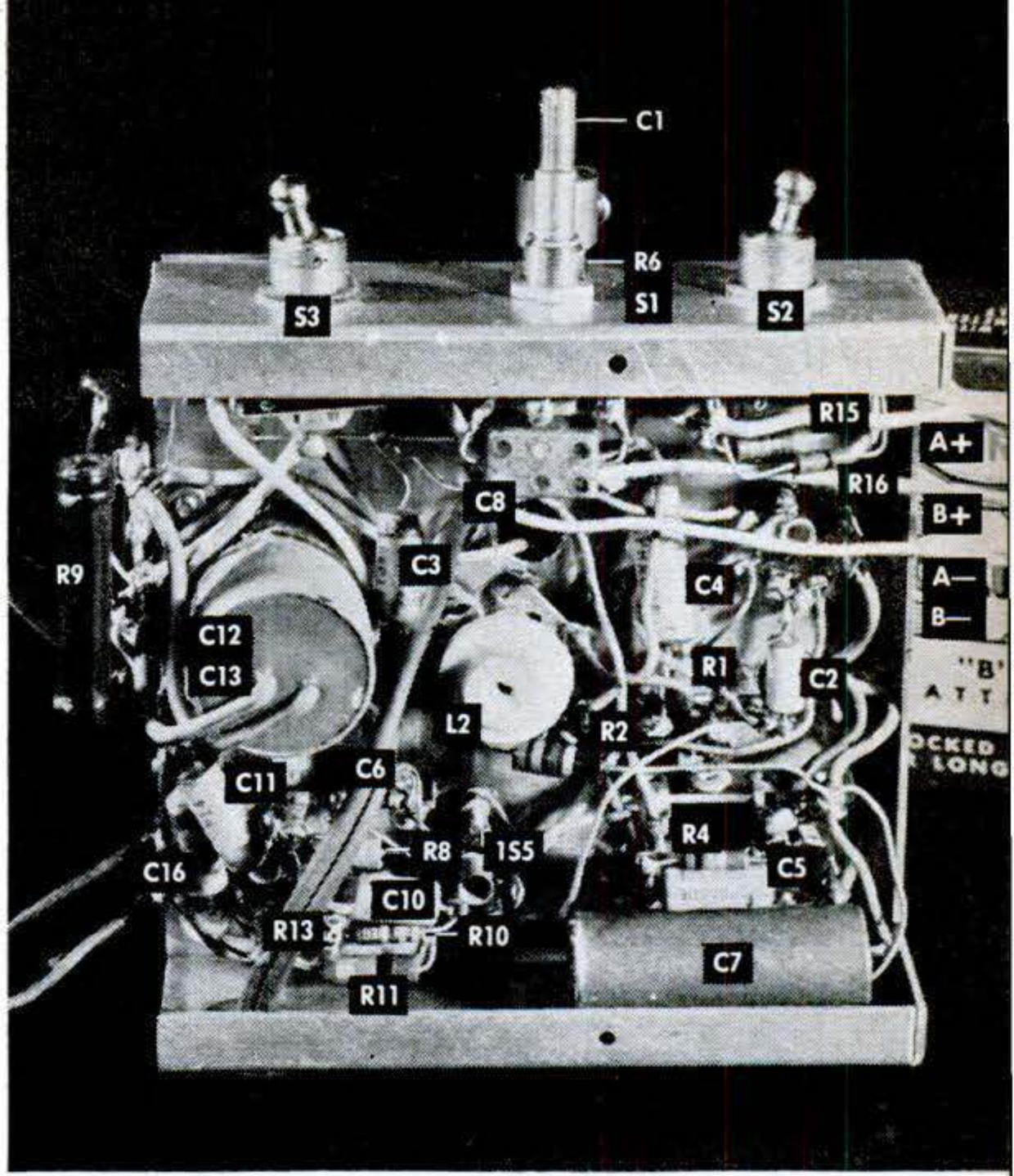
A small 90-volt battery was used in this set in order to hold down size and weight. If you don't mind a slightly heavier package, you can get even greater economy by using two of the huskier 45-volt batteries in series.

Another feature of this set is a simplified rectifier circuit for AC-DC operation. It consists of a 100-ma. selenium rectifier, three electrolytic condensers, and three resistors.

Copyrighted material



Wire-wound resistors are mounted outside the chassis for better heat dissipation. One machine screw holds the selenium rectifier.



The dual-electrolytic condenser projects partly below and partly above the chassis. It is fastened on top by its mounting collar.

One of the latter, R14, is a 1,500-ohm, 25-watt unit with an adjustable tap. Setting the tap varies the filament voltage. It should be adjusted so that the tubes get about 7 volts—or even slightly less—when the set is being operated on house current. For testing, fix the tap to give a division of about 1,200 ohms to 300.

The balance of the circuit follows standard practice pretty closely. There are four miniature tubes in addition to the dry-disk rectifier, making this the equivalent of a five-tube superhet. The first tube, a 1R5, is a pentagrid converter that acts as an RF amplifier and local oscillator. The incoming signal is tuned by one section of the two-gang tuning condenser, C1; the other gang tunes the oscillator. Try to buy a condenser that has cut plates for the oscillator section, and built-in trimmers on both gangs.

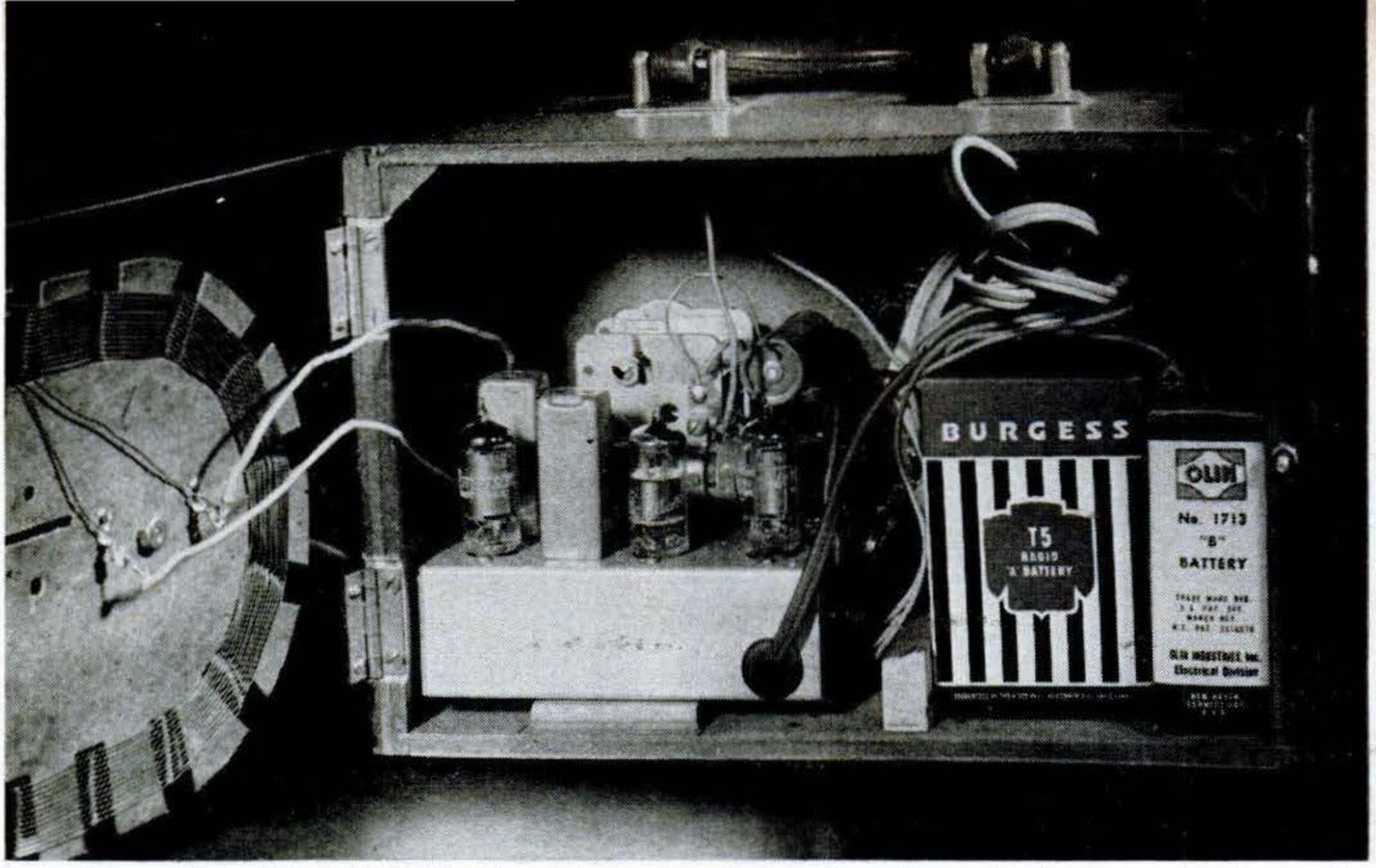
The IF amplifier, a 1U4, operates at the fixed frequency of 455-6 kc. Two IF transformers, tuned to the same frequency, are also employed. Midget transformers with powdered iron cores were selected as iron cores give higher gain. It makes relatively little difference whether fine adjustment is made by means of air-spaced trimmers or by moving the iron cores. The diagram indicates a movable-core transformer, but the trimmer type may be more generally available and will work as well.

A diode detector and pentode amplifier are combined in the 1S5. The former demodulates the RF signal, the latter acts as a first audio amplifier. The 3V4 tube used in the output stage is a relatively new development; it was selected because of its effectiveness in amplifying weak signals and bringing them up to loudspeaker volume. Although this tube has a plate impedance of 10,000 ohms, it was found that an output transformer with an 8,000-ohm primary and 3.5 to 4-ohm secondary gave satisfactory matching. Transformers of the latter type are more readily available in small sizes.

An aluminum chassis measuring 1½" by 4¾" by 5" provided ample space. However it is always a good idea to assemble the parts for a set before finally determining the chassis size and arrangement. Aluminum is first choice for the chassis as it can be drilled and cut easily. Seven large holes had to be made for the tube sockets, the dual-electrolytic condenser, and the IF transformers. Socket holes are ⅝" in diameter, those for passing the IF leads through the chassis are ½". The 50-30 dual electrolytic used here required a 1⅛" hole in order to be mounted, as shown, partly above and partly below the chassis. If you don't have chassis punches in the right sizes, drill smaller holes and file or ream them to the required diameters.

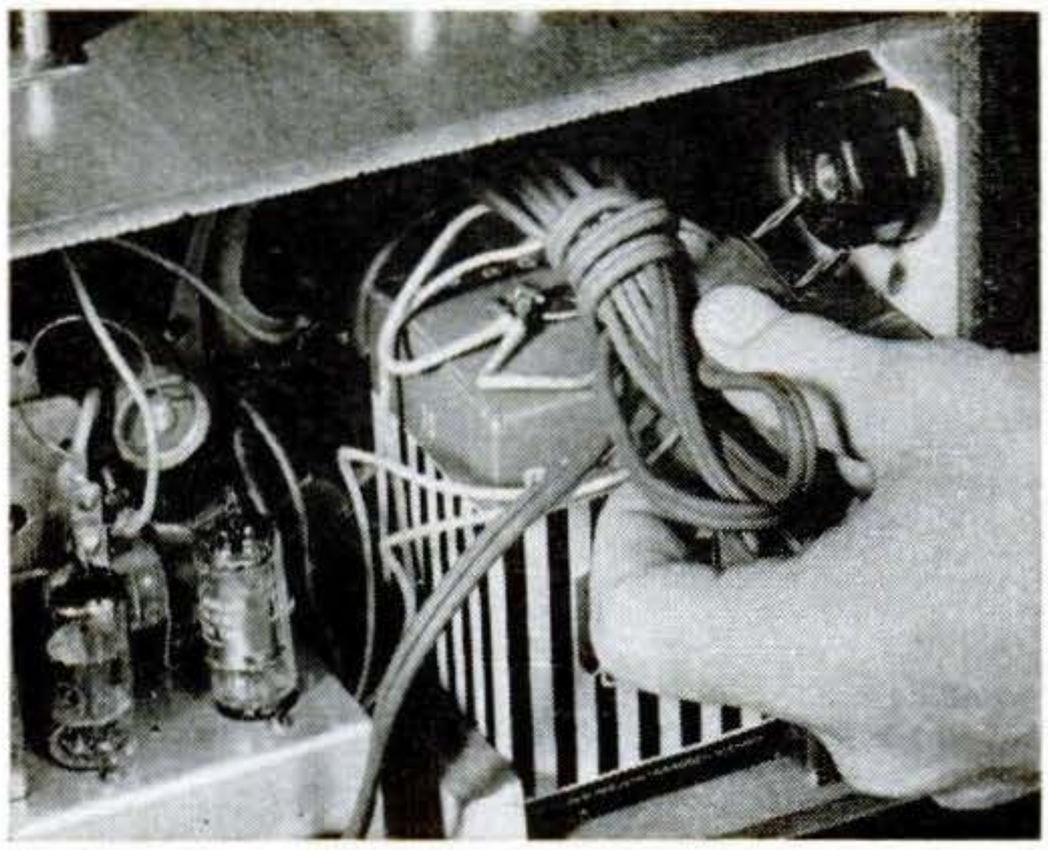
Solid pushback wire is the easiest to use

Copyrighted material



A small wooden cleat behind the chassis keeps it from sliding back in the cabinet. Cleats are also used to keep the batteries in place. For carrying, a leather handle is screwed on top.

for wiring the parts, and is suitable for all except the battery leads and those to R14. Cotton-covered stranded wire has the inside track for these connections where extra flexibility and current-handling capacity are important. Note that R5, R9, and R14 are all mounted above or outside the chassis. This is done because these resistors—all of the wire-wound type—generate more heat than could be readily dissipated if they were confined under the chassis. They only come into operation when the set is used on a 115-volt line. Should they appear to get too hot, it might be well to open the back cover when the set is kept on for long.

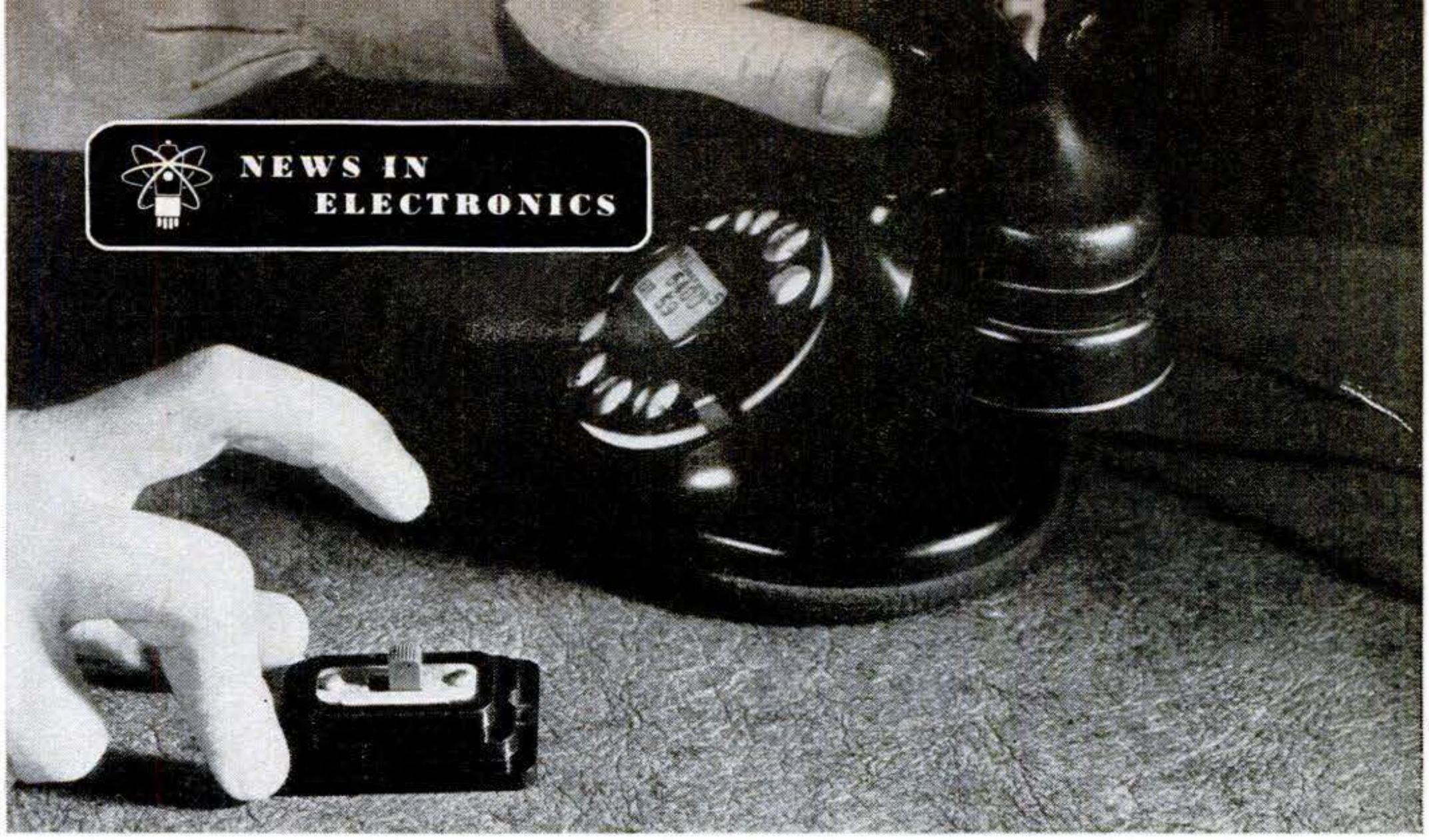


A dummy wall outlet is screwed to the side of the cabinet to provide an anchor for the AC-DC cord when the set is operated on batteries.

Although IF transformers are preset at the factory, wiring them into a set may throw them slightly out of adjustment. When the assembly is completed, tune in a station at the high end of the broadcast band (the plates of the tuning condenser are out of mesh at the high end) and rock the trimmers on the IF transformers very slightly to peak the signal. Use a small screwdriver for this adjustment, or, preferably, an insulated tuning wand. Make any similar adjustment that may be necessary on the trimmer alongside the oscillator section of C1. Rock the tuning dial back and forth while adjusting this trimmer, and then make a final check on a station at the low end of the band.

An inexpensive solution to the cabinet problem is to use one of the replacement cabinets for AC-DC receivers available at many supply houses. It isn't likely that any of them will come with carrying handles, but an attachable luggage handle takes care of that. Cut a plywood, plastic, or similar back to the proper size and hinge it to the cabinet along one edge. A loop antenna can be fastened to the back with a couple of screws. The speaker is attached directly to the front panel behind the grille, and the chassis is held by the two toggle switches, the volume control, and the tuning condenser. If necessary, tack in wooden cleats to keep the batteries from shifting inside the box. **END**

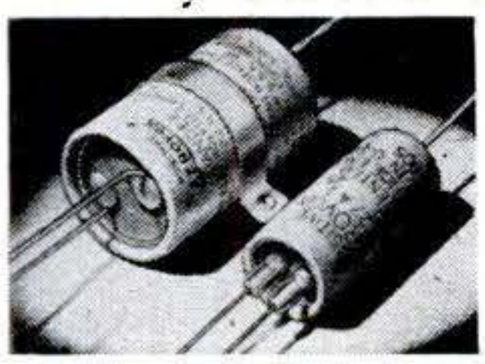
Copyrighted material



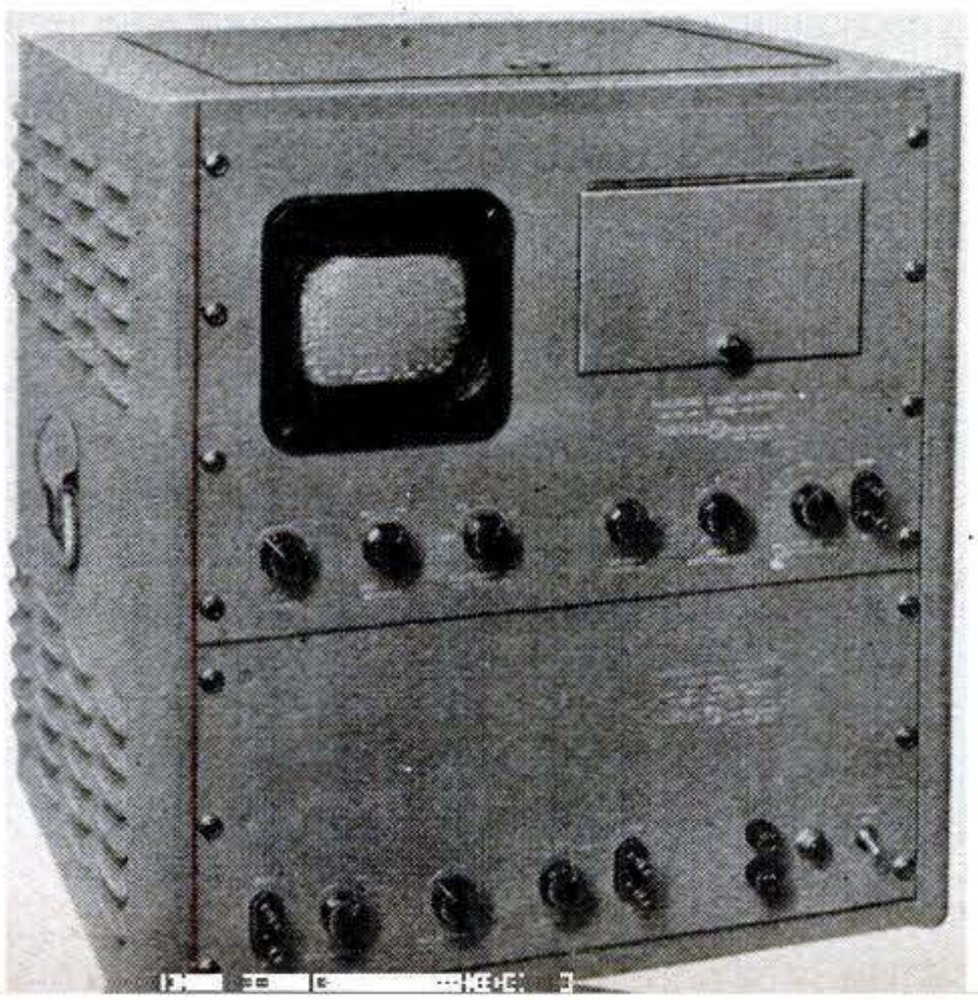
NEWS IN ELECTRONICS

Switch Cuts Radio Volume. Phone conversations needn't be interrupted by loud radios. The Rad-lo®, sold by Nelson-Foote Mfg. Co., Boulder, Colo., consists of two wires that connect to the speaker and a switch that is placed near the phone. Other listeners aren't disturbed as the switch cuts volume but doesn't turn off the set.

Electrolytics Made Smaller. Stud terminals used in place of end rivets have resulted in reducing the size of dual electrolytic tubular capacitors. Aerovox Corporation, New Bedford, Mass., has introduced a new line of these condensers ranging down to 11/16″ in diameter.

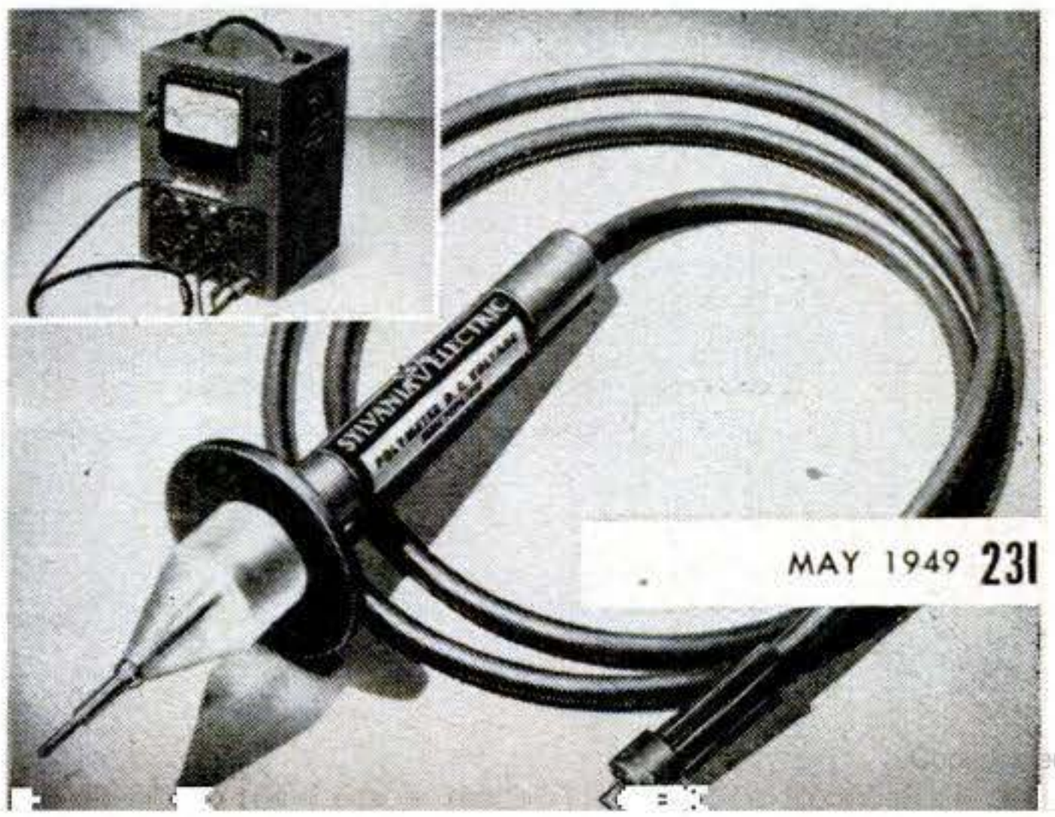


Instrument Analyzes Sound. Extending the methods of panoramic analysis (PS, Sept. '46, p. 196) from the radio-frequency to the audio-frequency spectrum, Panoramic Radio Corporation, New York, has introduced the Sonic Analyzer®. It automatically separates and visually measures the components of a complex sound wave.



Device Reduces TV Mismatch. Electrical matching between a television antenna and receiver is improved in many cases by the Telematch®, made by Standard Transformer Corporation, Chicago. A 12-position switch allows the user to select the best antenna match for a particular station or location.

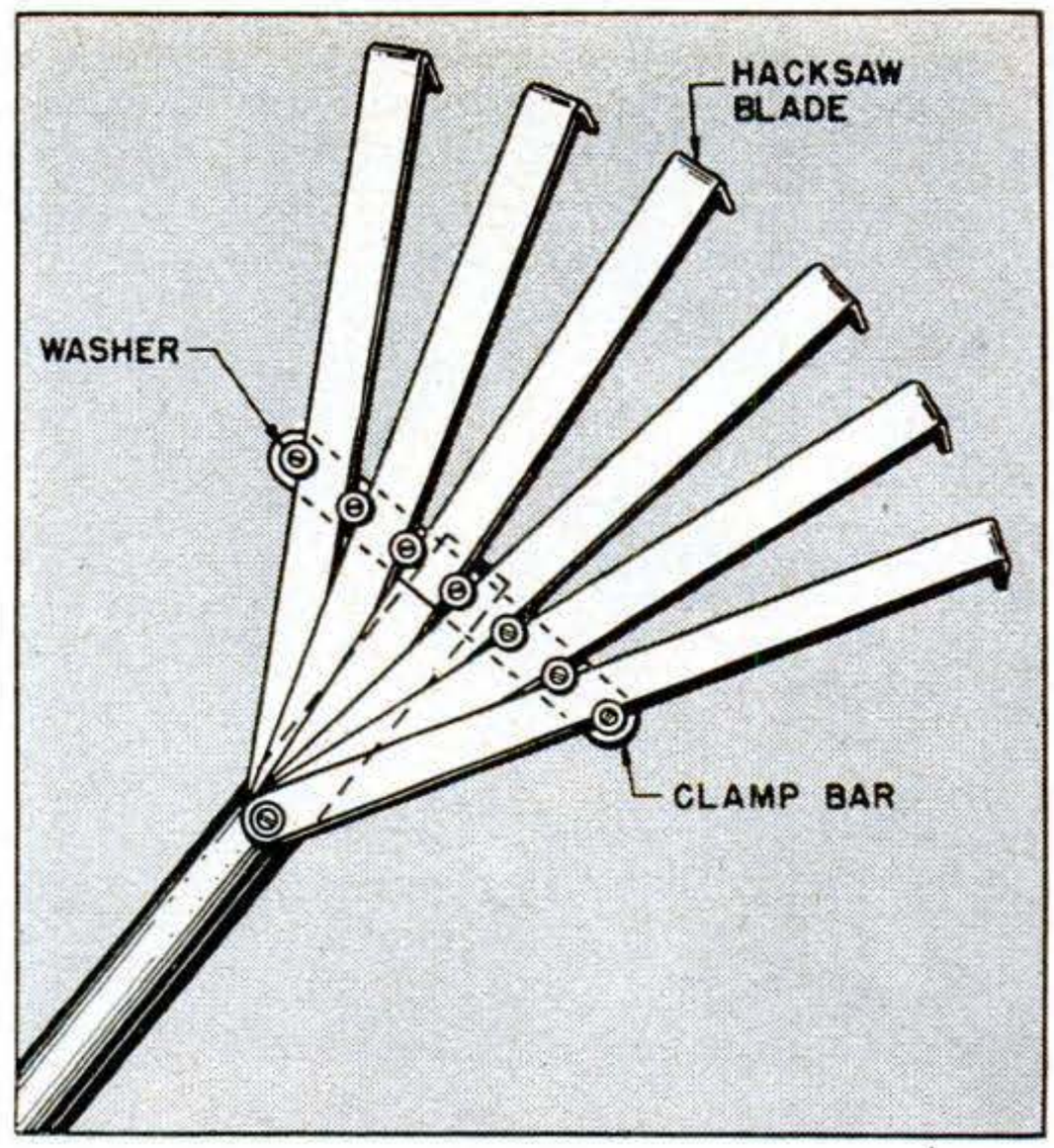
Lead Extends Meter Range. A DC voltage multiplier built into a test prod has been announced by Sylvania Electric Products, Inc., to adapt their previously released multitester (inset) for measurement of television high-voltage supplies. The lead is plugged into the meter case in place of the low-voltage probe and multiplies each of the DC ranges by 10, allowing for measurements up to 10,000 volts.



Baby Rides in Back Pack

PLANNING a hiking trip through a national park this summer, my wife and I wondered what to do with the baby, who has to go along. Here's how we solved the problem.

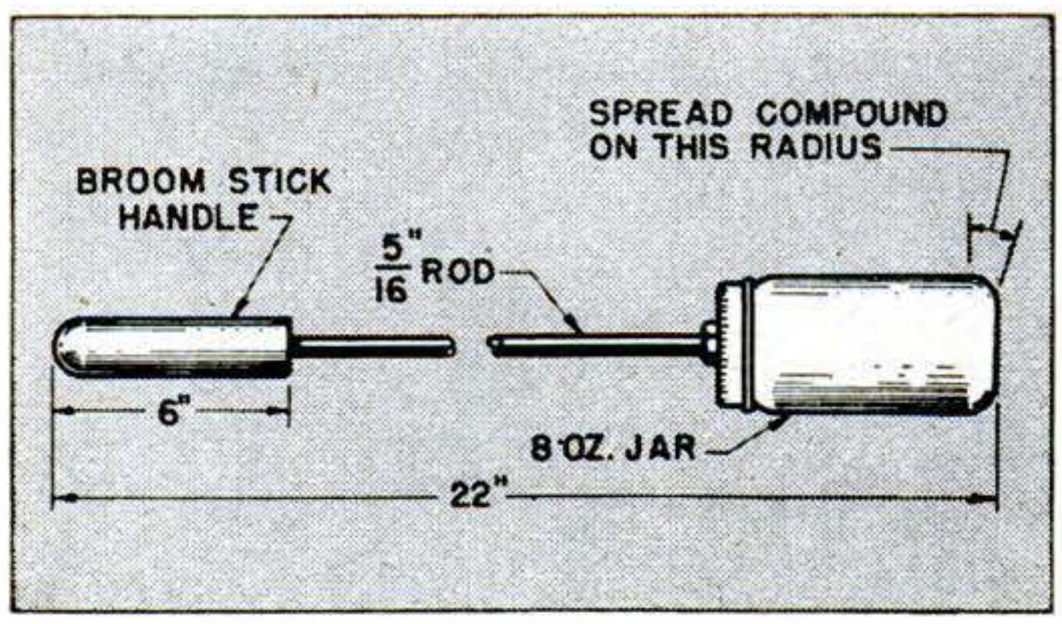
At a surplus store, I bought for 49 cents a carrying case intended for a field radio. Plywood was cut to fit the back, another piece installed as a seat, and a heavy wire, bent to U-shape, was secured to the front edge. The result is a portable "covered wagon." The case has several pockets for necessary extras.—*M. W. Bradshaw, Santa Rosa, Calif.*



Rake Made from Saw Blades

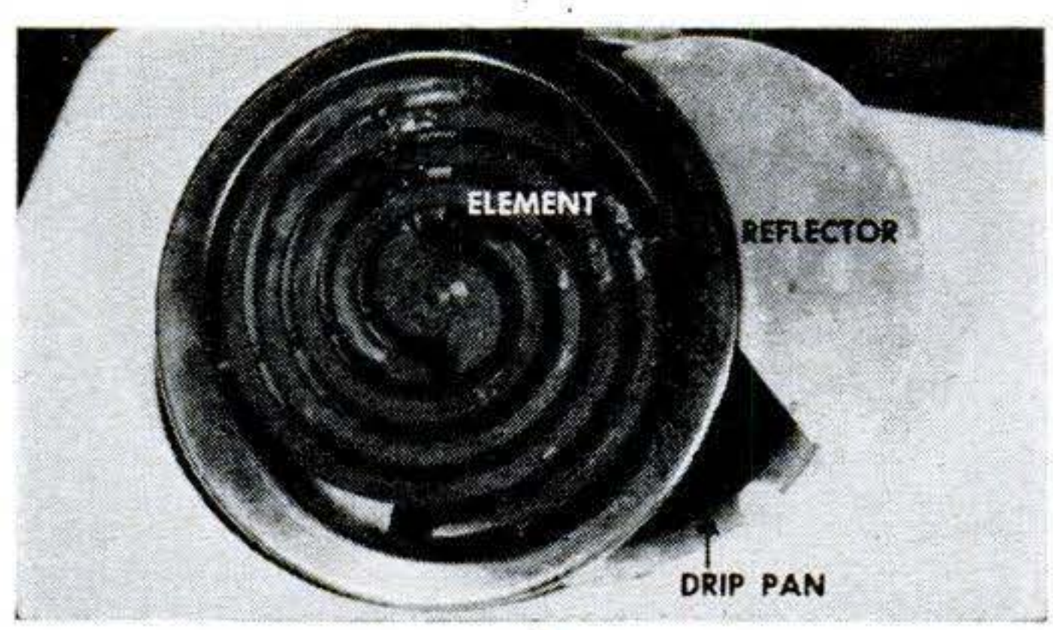
WITH half a dozen old hacksaw blades, you can make a small garden rake that's often useful in spots where you couldn't work with a larger one.

Break off the tip of each blade so you have a square end. Bend about ⅜" of this end to a right angle, heating first to soften the metal. The teeth may be ground off or left as they are. Fasten the blades to the handle with a bolt through the eyes. Space them on a drilled strap of iron with bolts and washers.—*C. H. Hardy, Los Angeles.*



Tool Refaces Flush Valve Seat

WHEN the valve seat in a toilet becomes pitted, a new ball valve doesn't always stop leaks. With the tool shown, I've been very successful in refacing such worn seats. I start with a coarse grade of auto-valve grinding compound, finish with a fine grade. Twirling the handle between my palms gives good grinding action. After several jobs, it's best to put on another jar since the glass wears thin.—*A. P. Muhl, Syracuse, N. Y.*



Reflectors Improve Old Range

MANY of the older electric ranges don't have the heating efficiency of the newer ones for a simple reason. They lack a reflector below the open-coil elements.

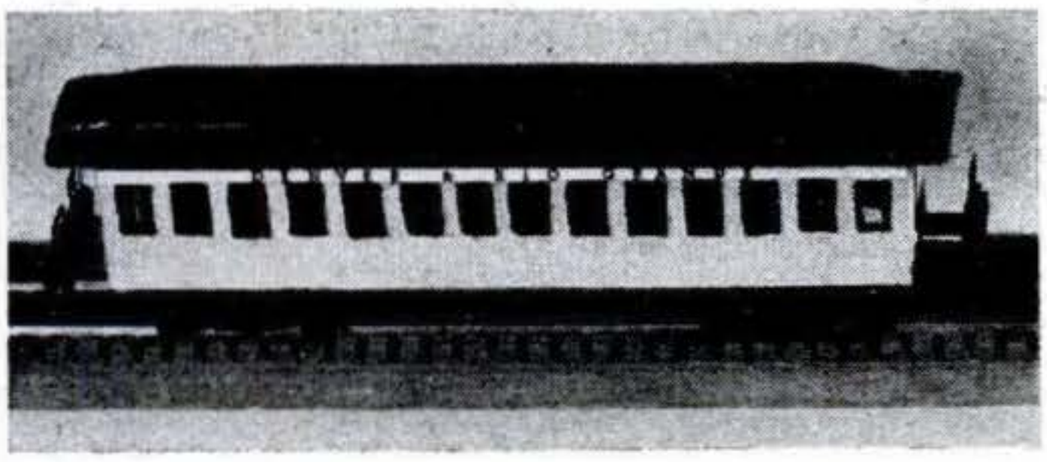
You can remedy this at little cost. Buy a few sheets of aluminum. After removing the drip pans from beneath the elements, cut aluminum to fit into the pans. Then replace the pans. Keep the reflectors bright by rubbing occasionally with steel wool.

Copyrighted material

Here's a baggage car for the locomotive shown last month. Below is matching passenger car.

Finishing Your Narrow-Gauge Train

By George Walton

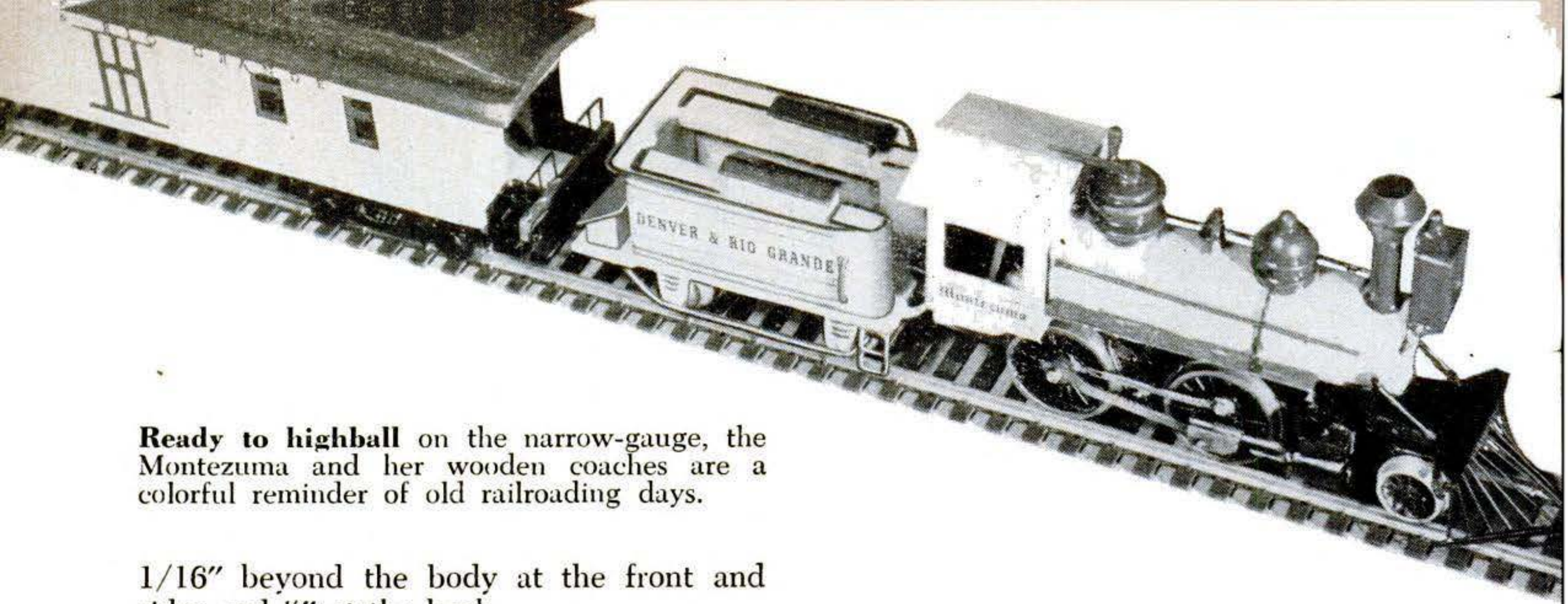


THE Denver & Rio Grande's Montezuma, for which plans appeared last month, had a four-wheeled tender. On this were mounted three tool boxes, which probably carried the usual engine tools, extra brasses in case of hotboxes, rerailing frogs to lift derailments off the ties, and chains to link up broken drawbars. On a road as rugged as the old-time D & RG, such emergencies weren't exactly rare.

All patterns are shown full size in the drawing, but only half of each appears. Lay tracing paper over it, trace off, and fold the tissue carefully along the marked center line. Place the folded sheet on a piece of face-up carbon paper and draw over the lines. Unfolding gives you a full pattern.

For the tender, cut a strip of .032" (1/32") sheet brass ¾" by 6" and mark off a section 1⅛" wide at the center. Bend in two places to form an open U-shape. Then bend the two ends around a bit of ¼" rod to a ⅛" radius, making the body 2" long and leaving a gangway ⅜" wide. Solder this piece to the sheet-brass floor, which projects

Copyrighted material



Ready to highball on the narrow-gauge, the Montezuma and her wooden coaches are a colorful reminder of old railroading days.

1/16″ beyond the body at the front and sides and ½″ at the back.

A bit tougher to make is the flared rim around the upper edge of the body. It's probably easiest to solder on three 3/16″ wide strips, one at a time. Round the ends of the side strips, cut all to a neat miter at the corners, and use a minimum of solder.

To the underside of the floor solder the journal boxes, which are simply sheet brass cut to the pattern given and bent on the dotted line to provide a soldering flange. Put a punch dimple in each to receive the pointed ends of the axles. I took these, together with insulated wheels, from an HO freight truck. Be sure to put the insulated wheels on the left side.

Two pieces of wood, with rounded ends, are cemented inside the upper edge of the body just below the flared rim. The two small tool boxes are glued to these. All the tool boxes are wood, with cardboard or sheet-brass lids, which project all around.

A loop of wire soldered at the front forms the coupling link to the pin on the engine. Solder a similar link and attach a standard HO coupler at the back of the tender. The steps measure 3/16″ by ⅜″. Solder them up from fine wire if you can't find ready-made ones of the right width. Finally, solder a strut of 1/32″ wire (a straightened paper clip does nicely) from under the floor to the bottom of the journal boxes and back up to the floor on each side. This can be seen in the photo above.

For the cars, I used balsa instead of sheet metal. They are light and put little load on the engine, but stand up well and look more like their wooden prototypes than metal ones would. The floor is a piece of ⅛″ stock, notched for the steps at both ends, leaving a center platform 7/16″ wide. Cement a balsa beam to this, and attach a purchased HO sill and coupler to the beam.

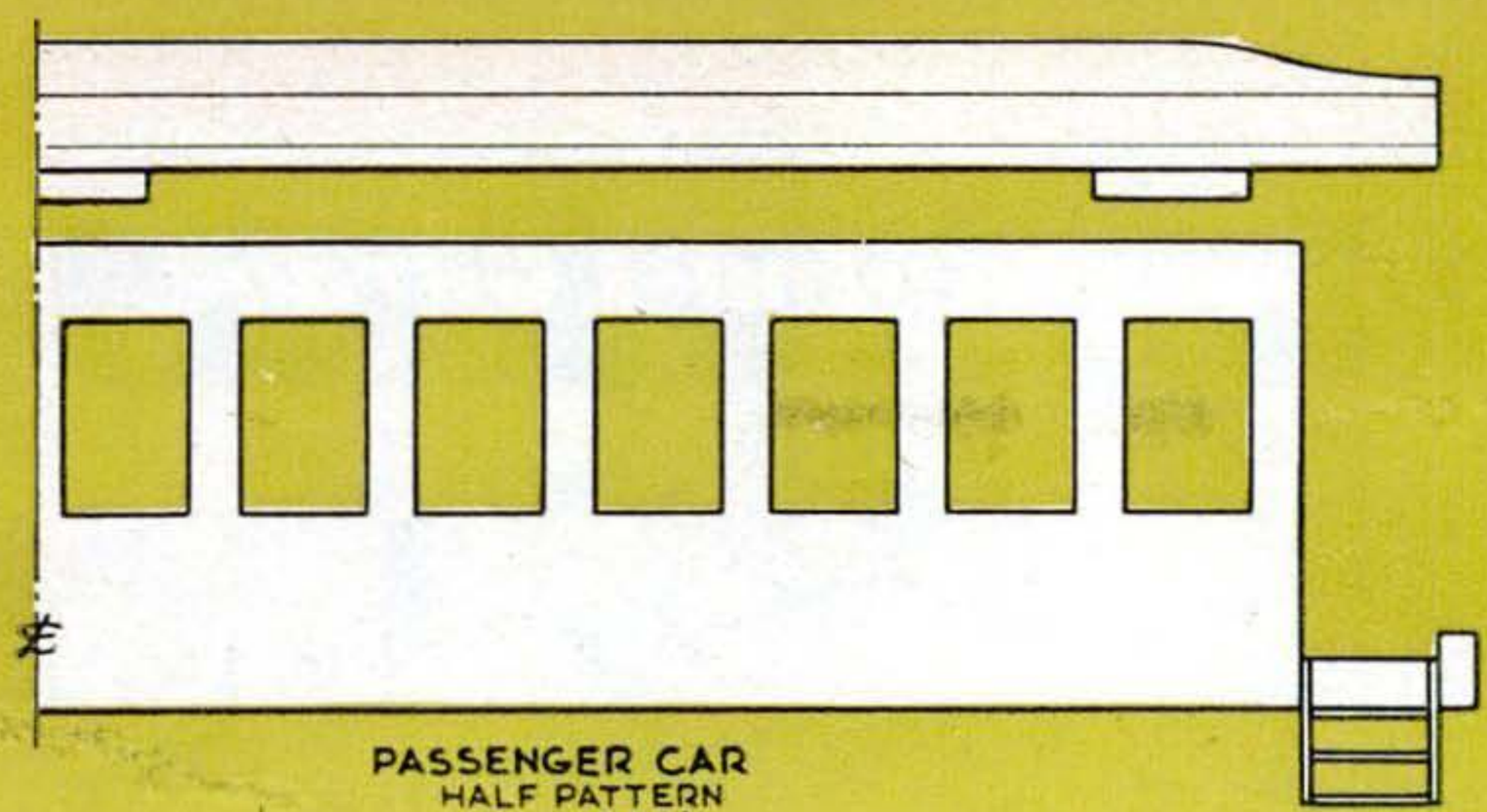
The car ends are ⅛″ balsa also, with the doorways cut out. You can inset thinner stock to simulate the door proper, if you like. Sidewalls are 1/32″ sheet, with all the window openings carefully cut out. Score these and the ends to represent the wooden construction of the day. Draw the sash frames on mica, cellulose film, or other transparent material and cement it behind the window cutouts. Glue in a couple of cross members from wall to wall near the top for bracing.

Build up each roof of ⅛″ and 3/16″ balsa. The rounded edges and sloping ends are quickly shaped with sandpaper alone. Small blocks glued to the underside locate the roof on the car. Space them for a push fit so that you can lift off the roof if you should want to add lights or interior details.

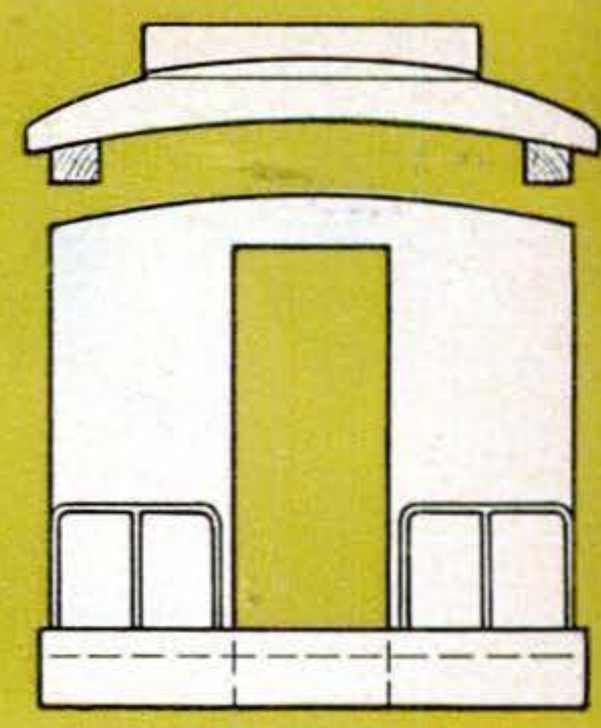
Platform railings are bent from thin wire or pins with the heads cut off. Make a U-shape, solder in a center post, and cement the assembly into the beam. Car steps can be made of .010″ brass or thin cardboard. Underframe details such as brake cylinders can be bought ready-made if you want to add them. Pivot HO passenger trucks with insulated wheels on the floor by a single small wood screw each, leaving them free to turn easily. It doesn't matter what side the bushed wheels are on.

Use a consistent color scheme for the whole train. The cowcatcher, engine underframe, wheels, and cylinders are black. The body color of the locomotive and cars is a bright yellow, with medium green for trim. Handrails, running boards, domes, stack, and bell are all green. So is the striping. If you think you can't paint a straight stripe, lay colored self-adhering tape on a sheet of glass, and with a razor blade cut narrow strips you can stick on where needed. Other possible color schemes are red and gold, or medium blue and orange. END

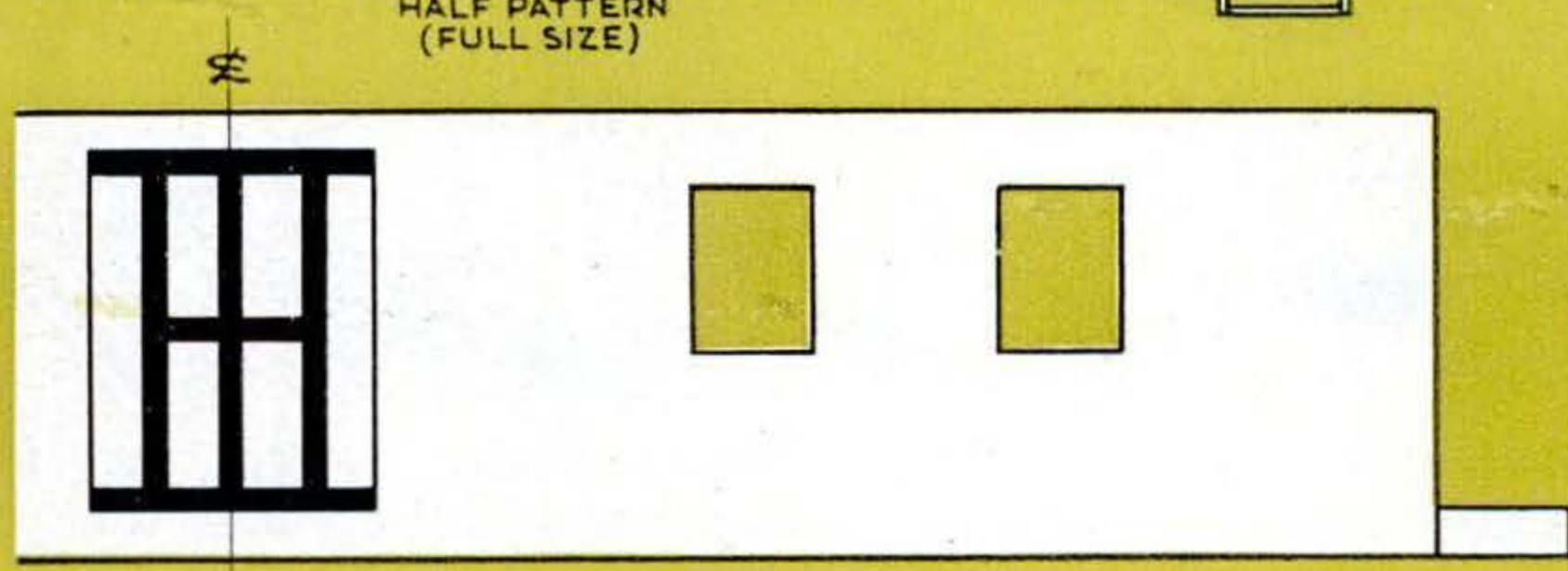
Copyrighted material



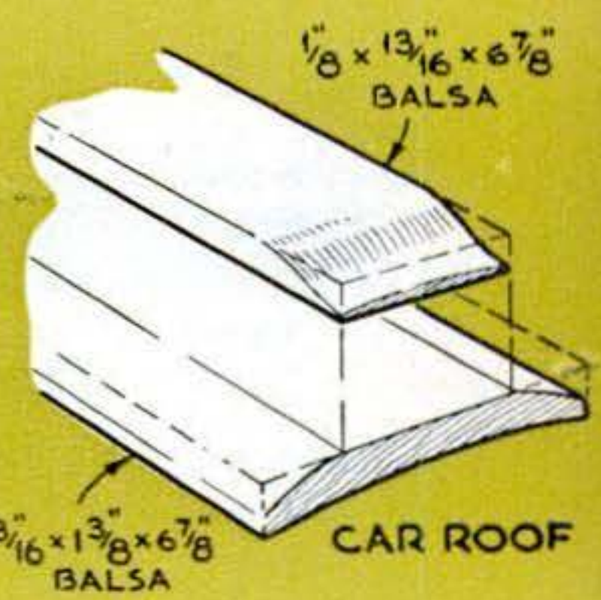
PASSENGER CAR
HALF PATTERN
(FULL SIZE)



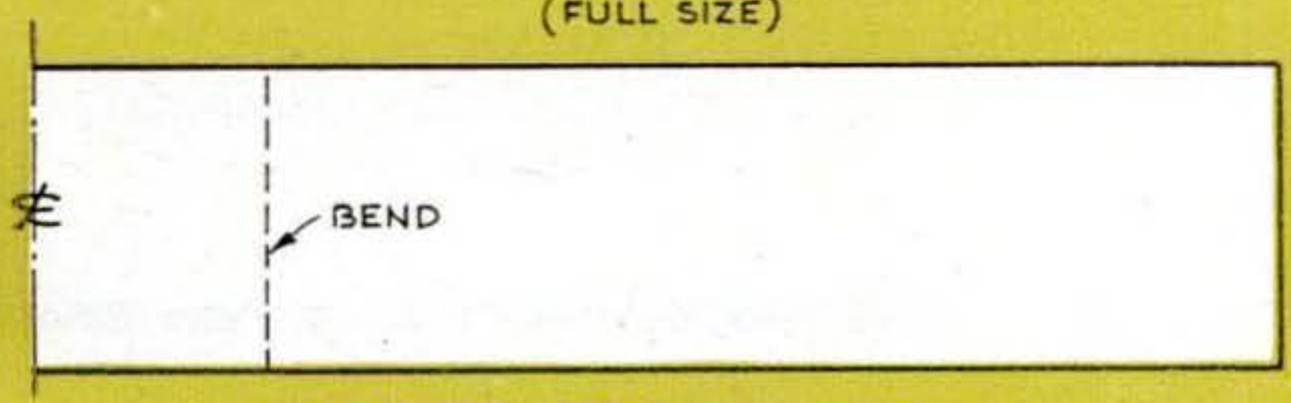
CAR ENDS
(FULL SIZE)



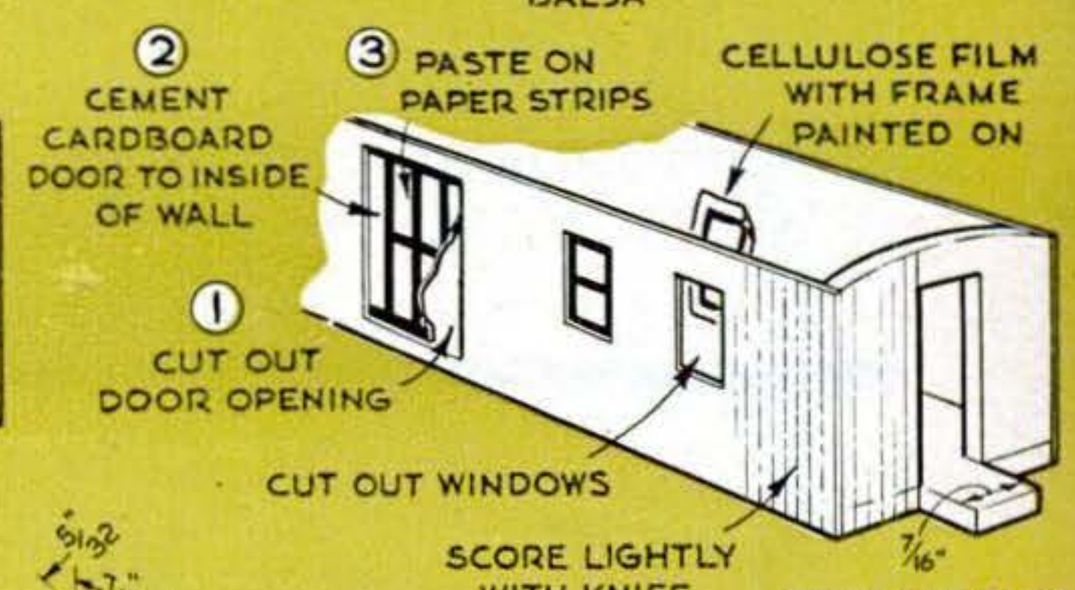
BAGGAGE CAR
(FULL SIZE)



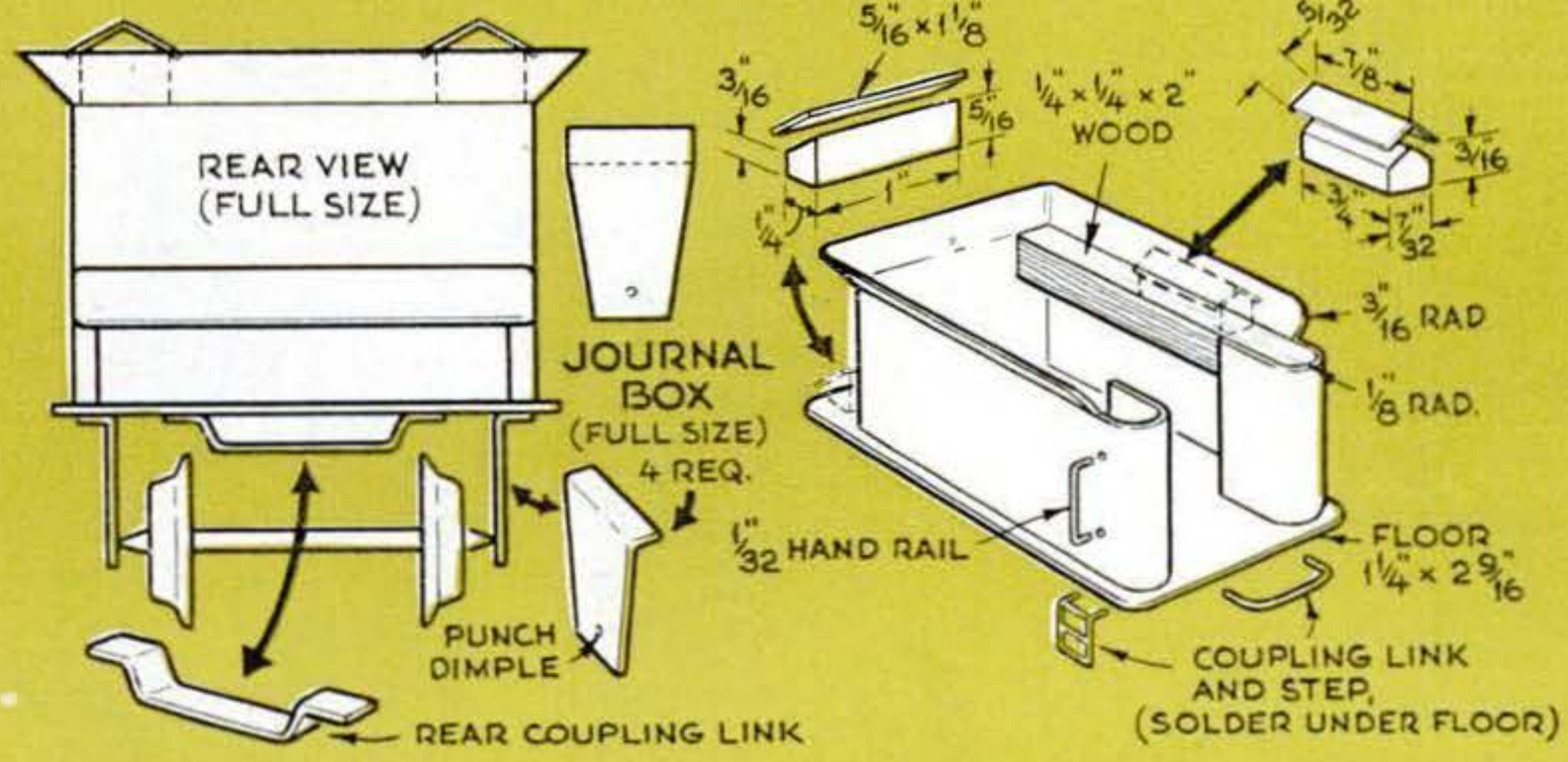
CAR ROOF



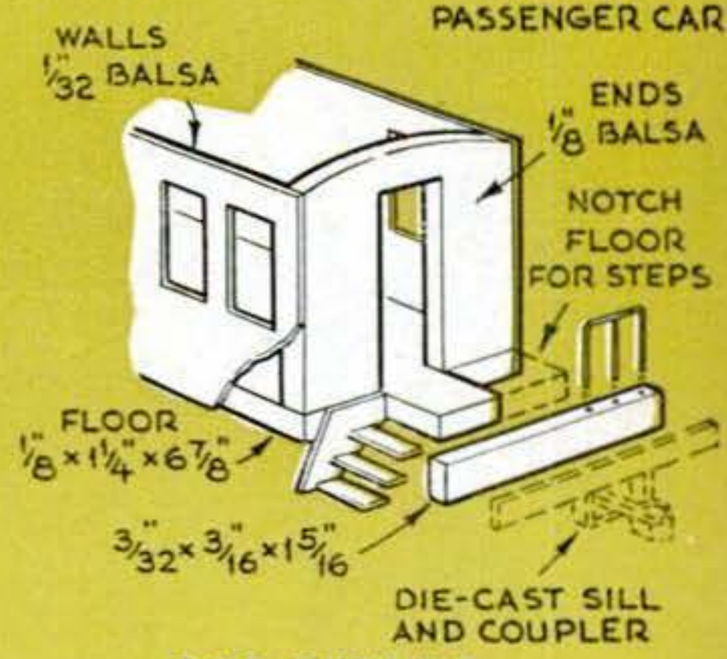
TENDER BODY (FULL SIZE)



ROOF AND ENDS
SAME AS
PASSENGER CAR



TENDER DETAILS



CAR DETAILS

D E N V E R & R I O G R A N D E DENVER & RIO GRANDE

D E N V E R & R I O G R A N D E DENVER & RIO GRANDE

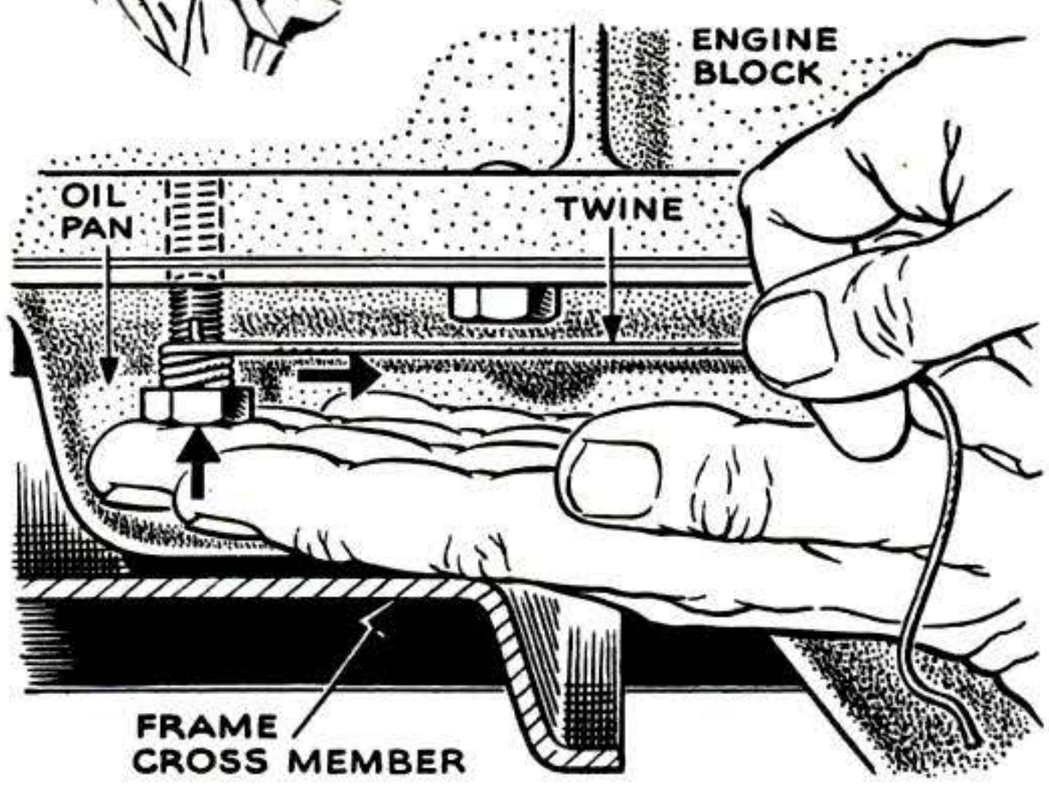
D E N V E R & R I O G R A N D E Montezuma

D E N V E R & R I O G R A N D E Montezuma

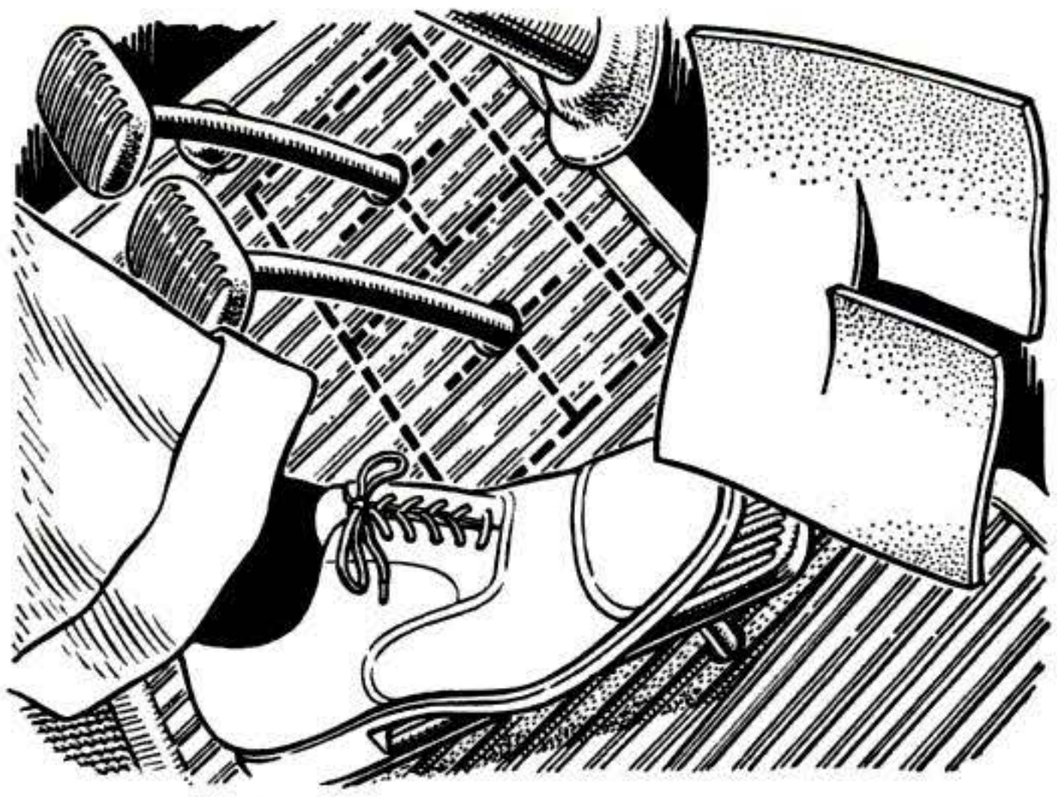
You can trace full-size patterns directly from the drawings. Actual-size car and engine lettering also appears above. Recessed freight door is made as shown in the numbered steps.

Copyrighted material

Hints from the Model Garage

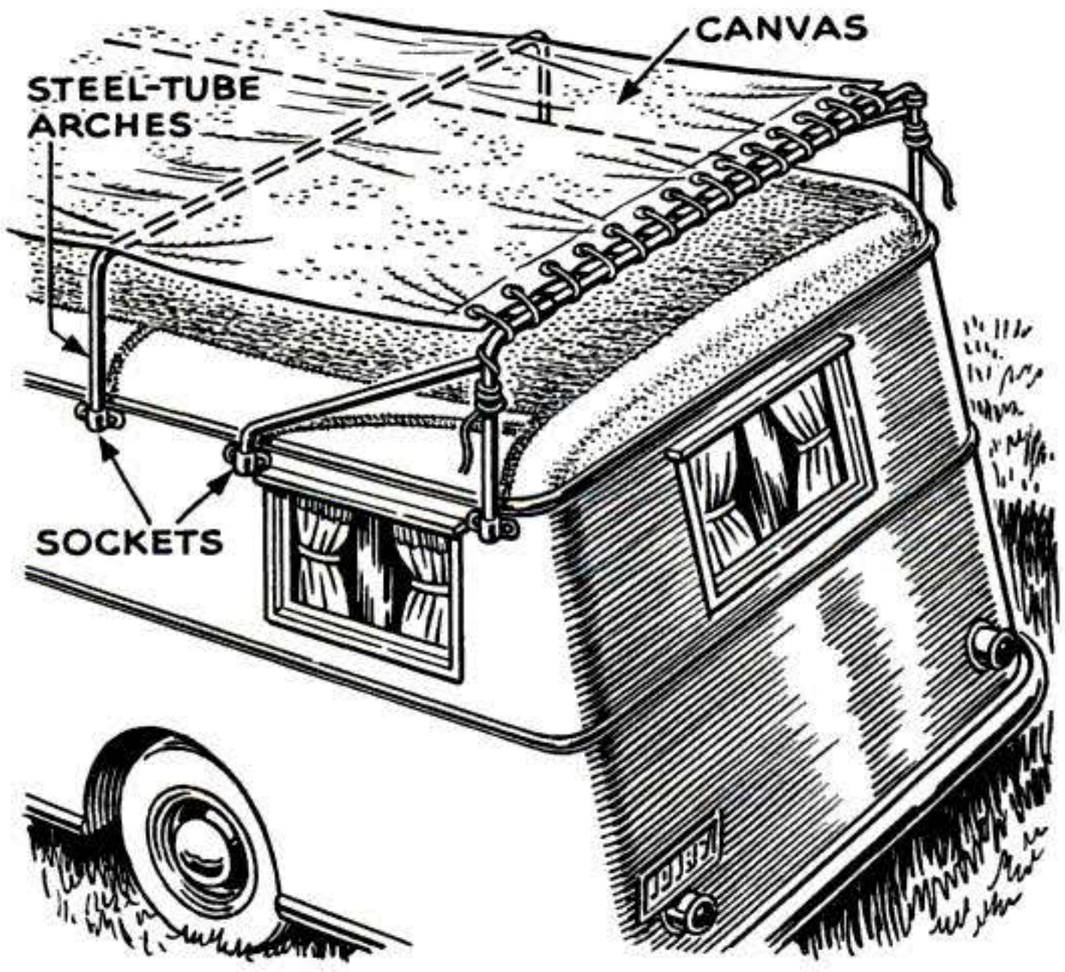


Twine Starts Bolts. Ben H. Clare, of Wellsville, Mo., suggests you use twine the next time you have to start a bolt in a hard-to-get-at spot. Wrap the bolt with twine, hold it in place with a finger or screwdriver and pull the twine. Sometimes it may be necessary to taper the end of the bolt.



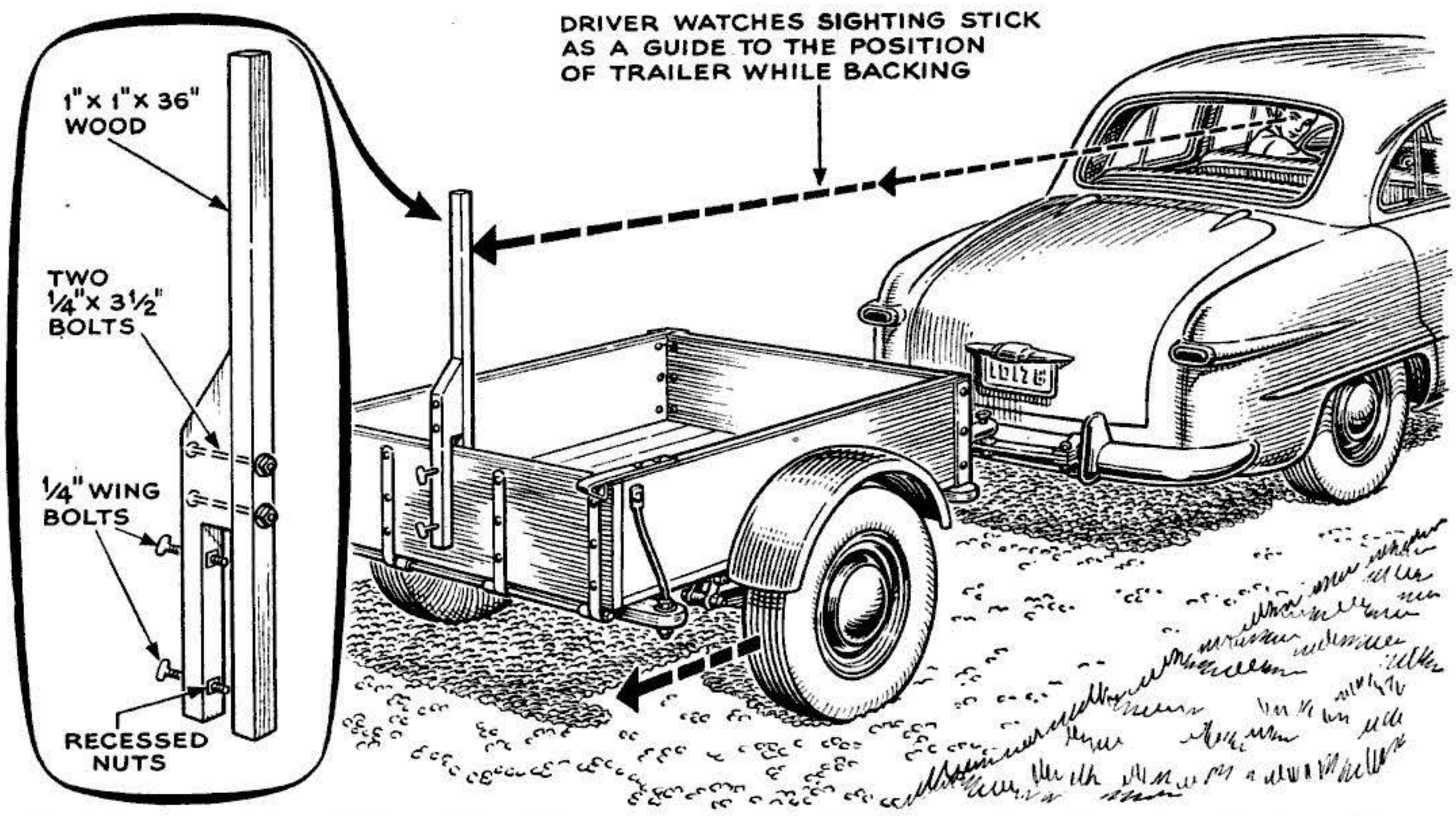
Floor Pads Stop Drafts. Wind that blows in around the shafts of the clutch and brake pedals can be stopped by pieces cut from an old inner tube or step pad. F. W. Marasco, of McKeesport, Pa., writes that it isn't necessary to secure the slit pieces if you cut them large enough.

Keep an Auto Log. Adapt the idea of the airplane flight log to your car. Plane owners keep a careful record of engine checks and repairs, among other things. Put a notebook in the glove compartment and record lubrication, servicing, and overhauls. A date and mileage record of performance troubles, unexplained noises, or the like is often a source of clues for trouble shooting. A log also gives you a record of expenses.

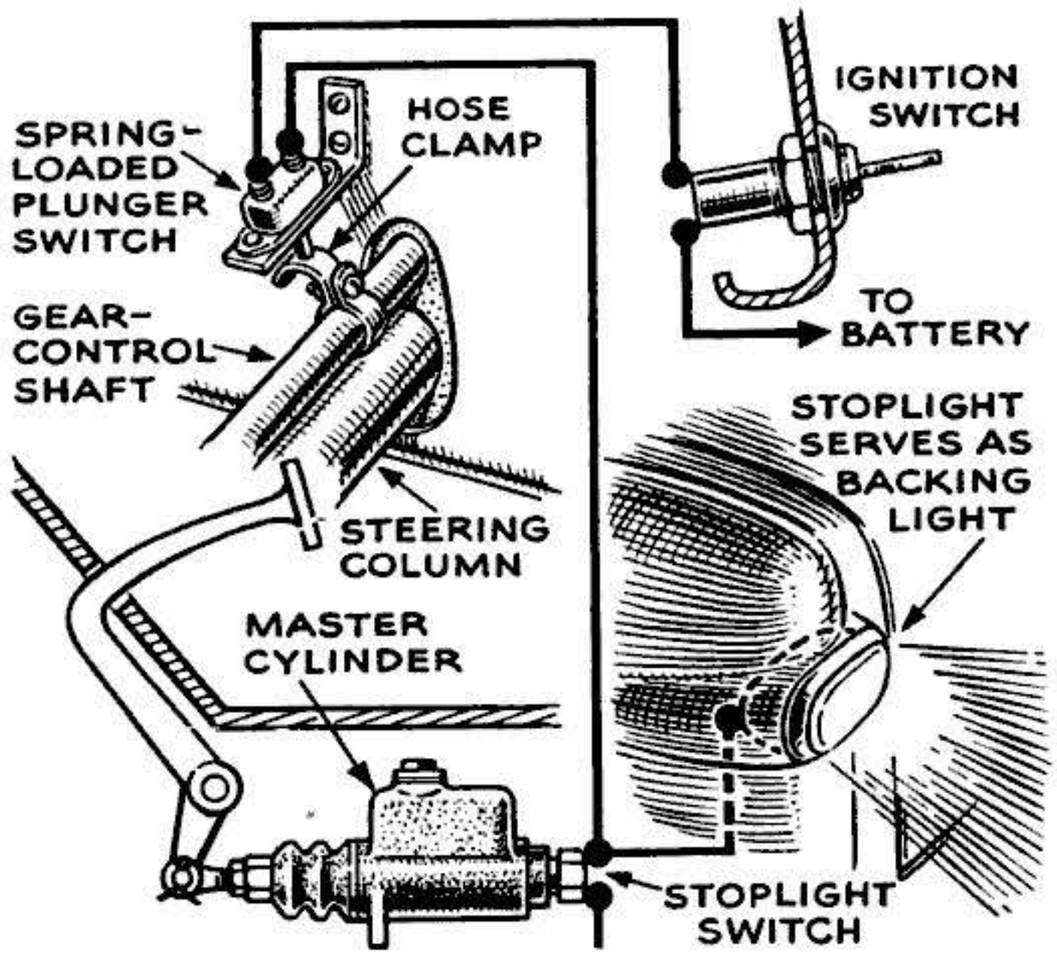


Awning Shades Trailer Roof. The interior of a parked trailer often becomes unbearably hot when the summer sun beats directly on it. To remedy this condition, A. V. Malone, of Los Angeles, built the shade shown above. It's canvas stretched over steel tubes that fit into sockets on the trailer. Mounted about 12″ above the roof, it has open sides for air circulation, lowering the inside temperature 10 to 20 deg.

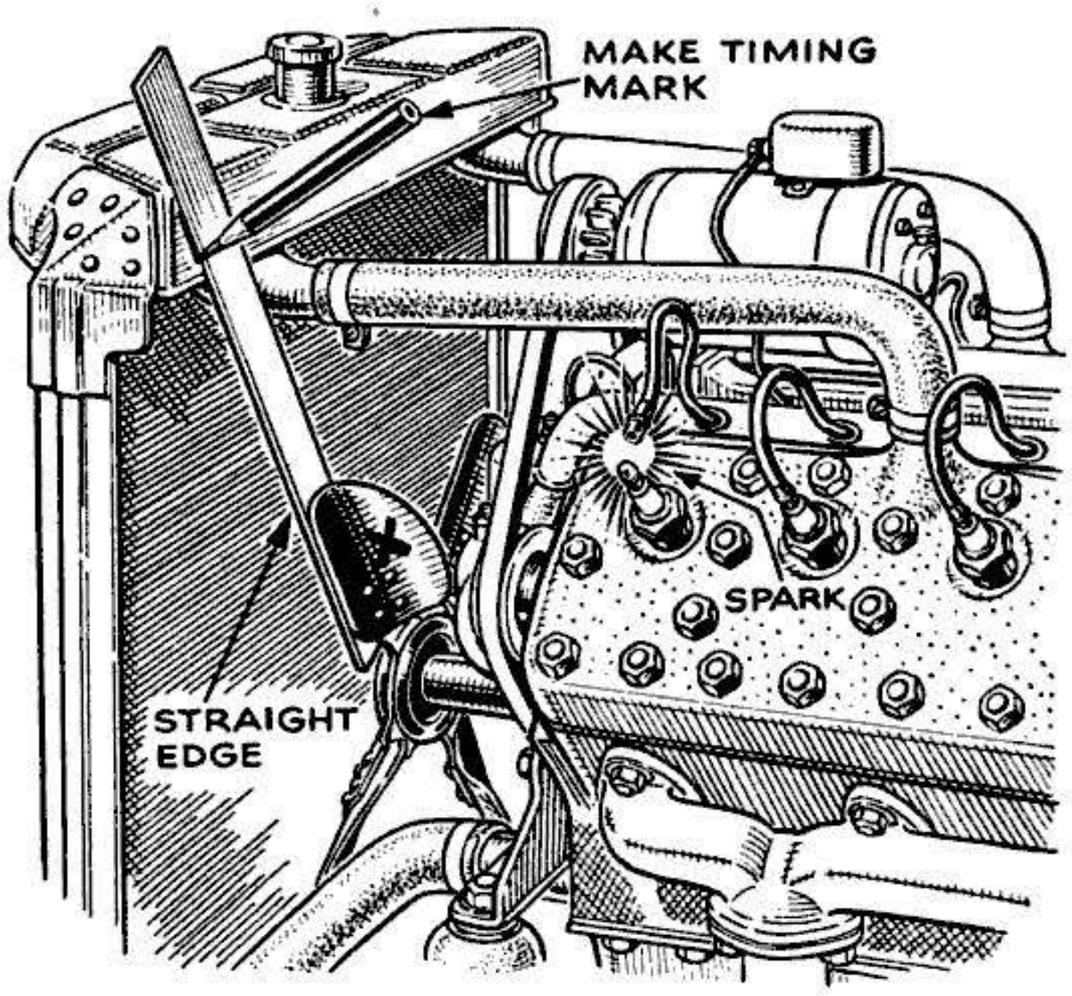
Copyrighted material



Guide for Backing Trailer. Anyone who has ever backed a two-wheel auto trailer will appreciate this simple guide to its direction. Suggested by Ralph S. Wilkes, of Keuka Park, N. Y., the directional guide is an upright hardwood stick about 1″ square by 3′ long and a clamping device. If you can't buy the wing bolts, make your own by heating the heads of ¼″ or ⅜″ machine bolts and flattening the heads with a hammer. The nuts are set into square recesses chiseled in the wood.

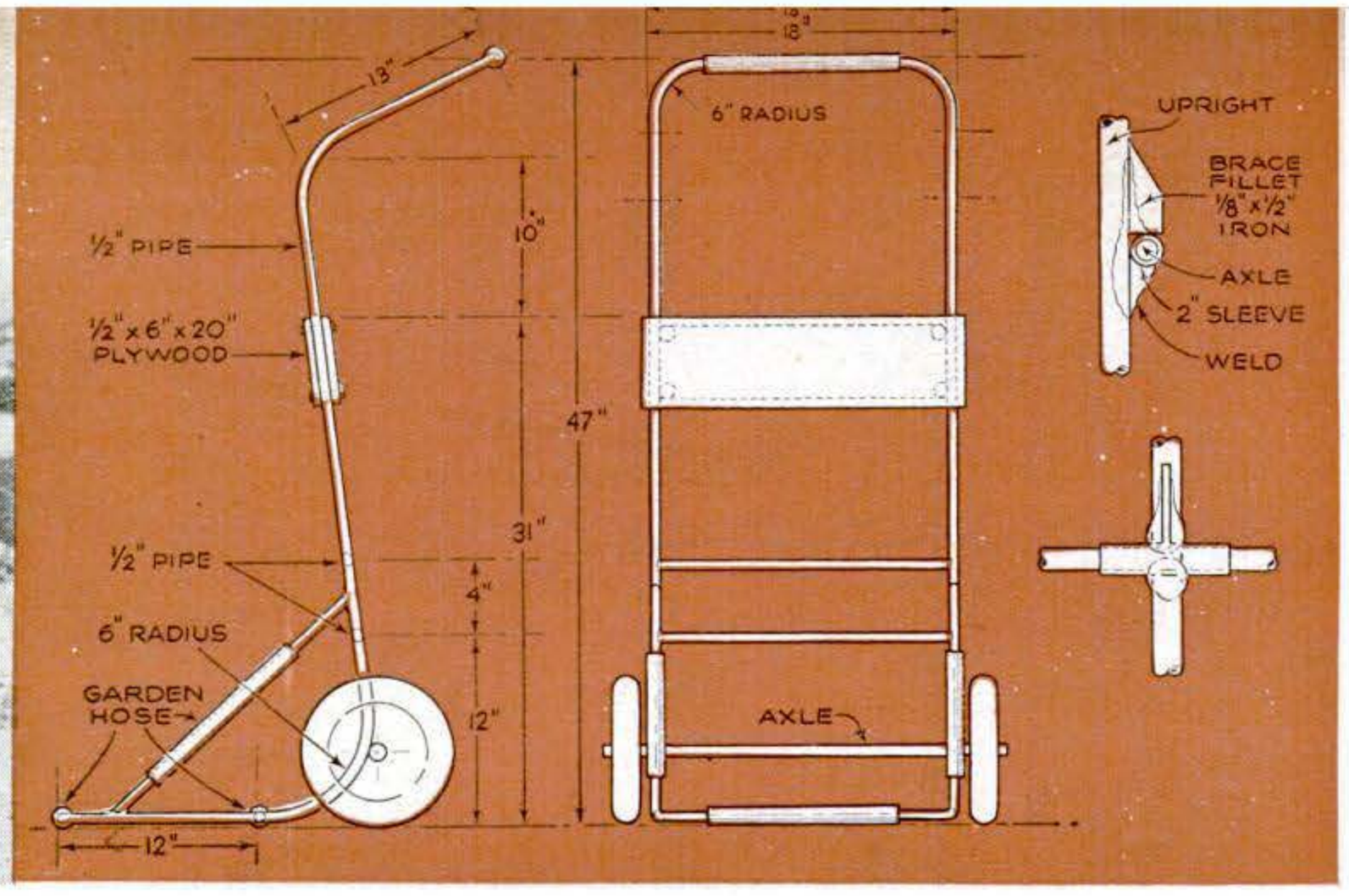


Light for Backing Car. F. W. Atwood, of Danvers, Mass., wired his stoplight so it serves also as a backing light. He mounted a spring-loaded switch on the firewall and a hose clamp on the shifter rod. Shifting into reverse turns on the stoplight. It's wired through the ignition so the car can be left parked in reverse. The motor can be started without the key (with shift in reverse and brake on), but this does no harm.



Ignition Timing Kink. Here's an easy method, writes H. W. Mills, of Albion, Ill., for checking the timing of a car with a direct-drive fan. Slowly crank the engine with the ignition on after disconnecting No. 1 spark plug. When you get a spark, use a straightedge on a fan blade to mark a spot on the radiator. Also identify the fan blade as well. This is mainly useful if one mark is made when the timing is just right.

Copyrighted material



Utility Cart Also Carries Outboard Motor

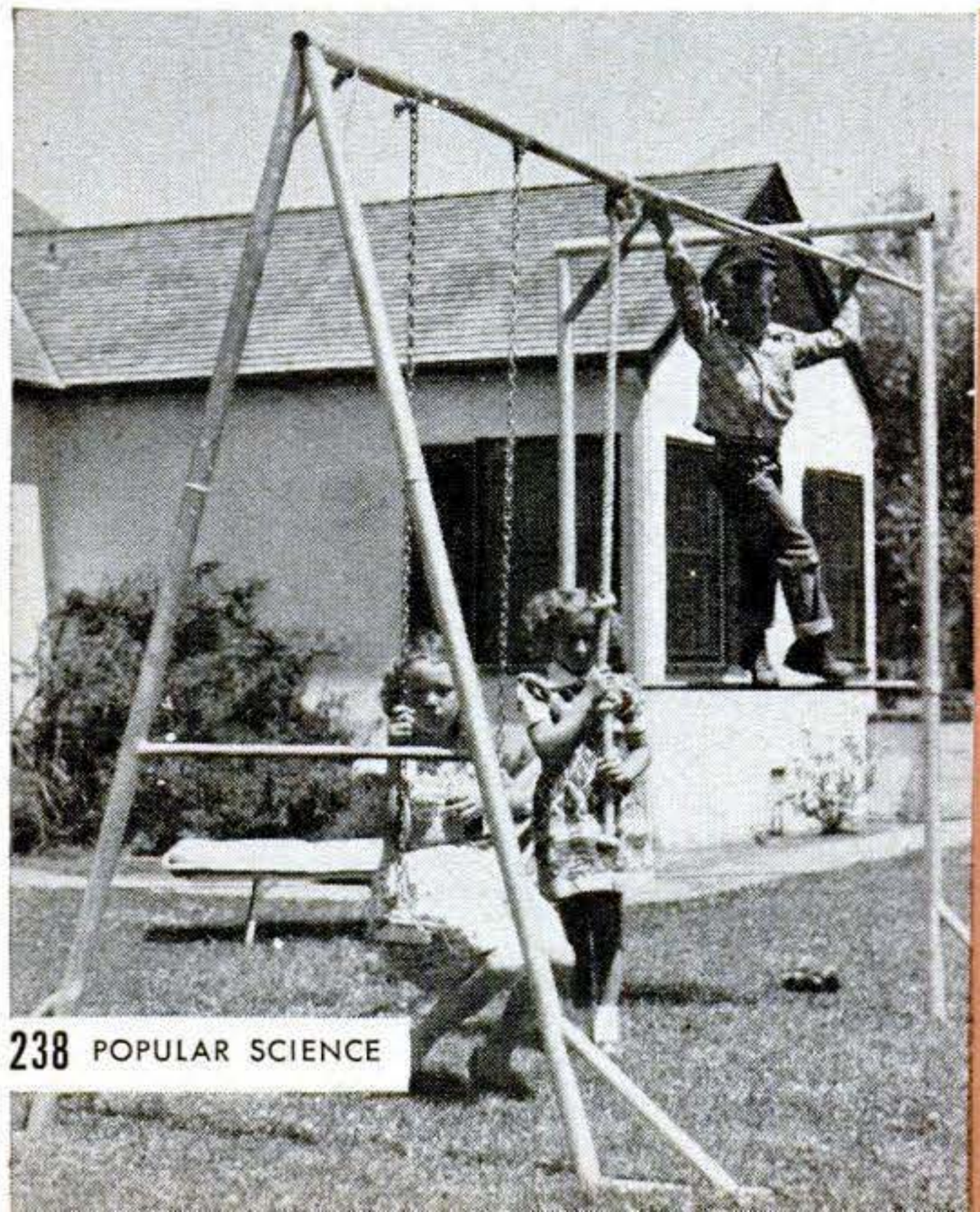
Though I built this cart primarily for my outboard motor, I've discovered many everyday uses for it around the house. It hauls the ash can, carries groceries, serves as a portable laundry basket, and becomes a wheelbarrow with the addition of a box.

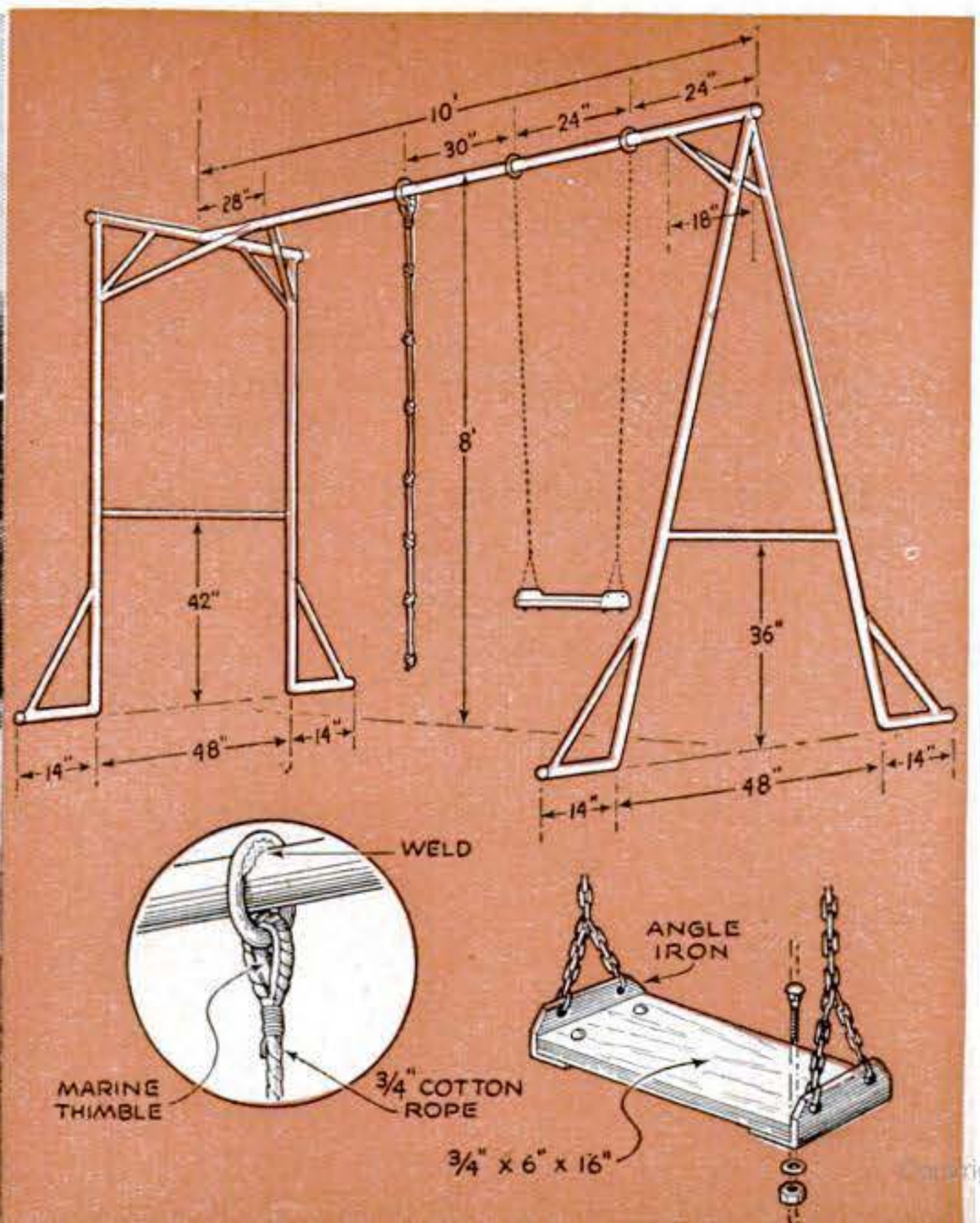
Construction details and dimensions are given above. Lay out the pattern on a floor. With a pipe bender or blocks nailed to the floor, slowly shape the pipe. Cut the cross-pieces to length and file the ends to fit the radius of the uprights. Then weld them in place. Old garden hose makes good buffers and a handle cover. Cut the hose to length, slit it, and tape it on the handle and the two braces as shown in the drawing. The ½" piece of plywood to which the motor clamps is bolted through the frame.

Any wheels from a small wagon or scooter will do, but semi-pneumatic wheels for a power lawn mower would be preferable. The larger the diameter, the easier they'll roll. The cart I built easily carries 300 lb.—*Lawrence L. Ames, Tacoma, Wash.*

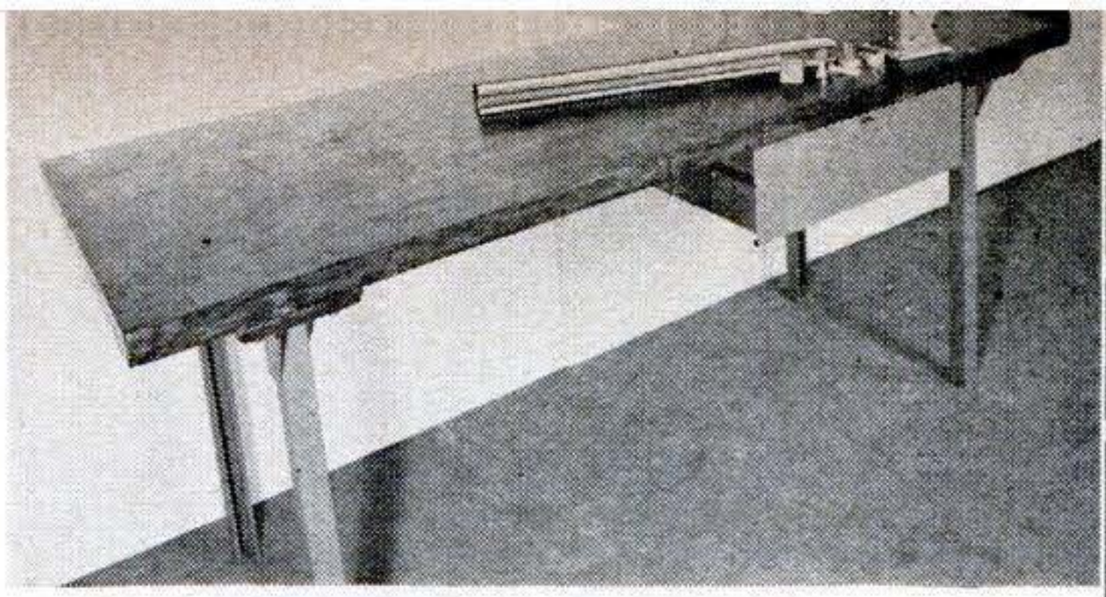
Portable Play Equipment Welded of 2" Pipe

Two adults can move this play equipment from one spot to another to follow sun or shade. Built by Frank Motte, of Nuevo, Calif., 2" black iron pipe is used throughout with 1" pieces for the braces across each end and at the corners. All joints are welded. Rings to support the swing and climbing rope are welded to the horizontal bar. The rope is bound over a marine thimble to prevent chafing. Use only cotton rope; hemp may leave slivers in the hands. The structure is finished with aluminum paint.





Copyrighted material

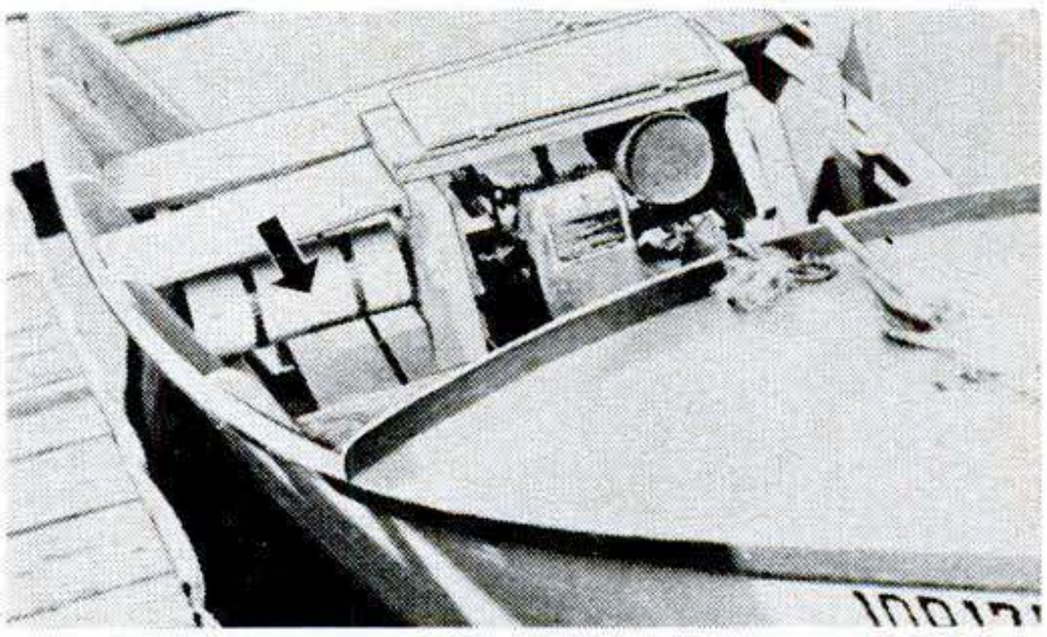


Steel Channel Makes Racks

WITH a hacksaw and a wrench, you can form these cold-rolled square steel channels into frames for workbenches, tables, storage bins, motor mounts, racks, supports for conduit and cable, and other utilities. Made by Unistrut Products Co., Chicago, the square channels have one side open. Once the framing is cut to required size, it's assembled by inserting a clamping nut in the continuous slot and tightening a cap screw. The nut may be inserted at any point along the strut. Two serrated grooves in the nut clamp to the ridges of the strut and automatically center the nut. It bridges the slot and forms a complete square where it's attached. An advantage of this type of framing is that it is re-usable. The parts may be reassembled in other forms. Made in five sizes from 19 to 12 gauge steel, the struts handle uniform loads up to 1,400 lb. over a 36″ span.

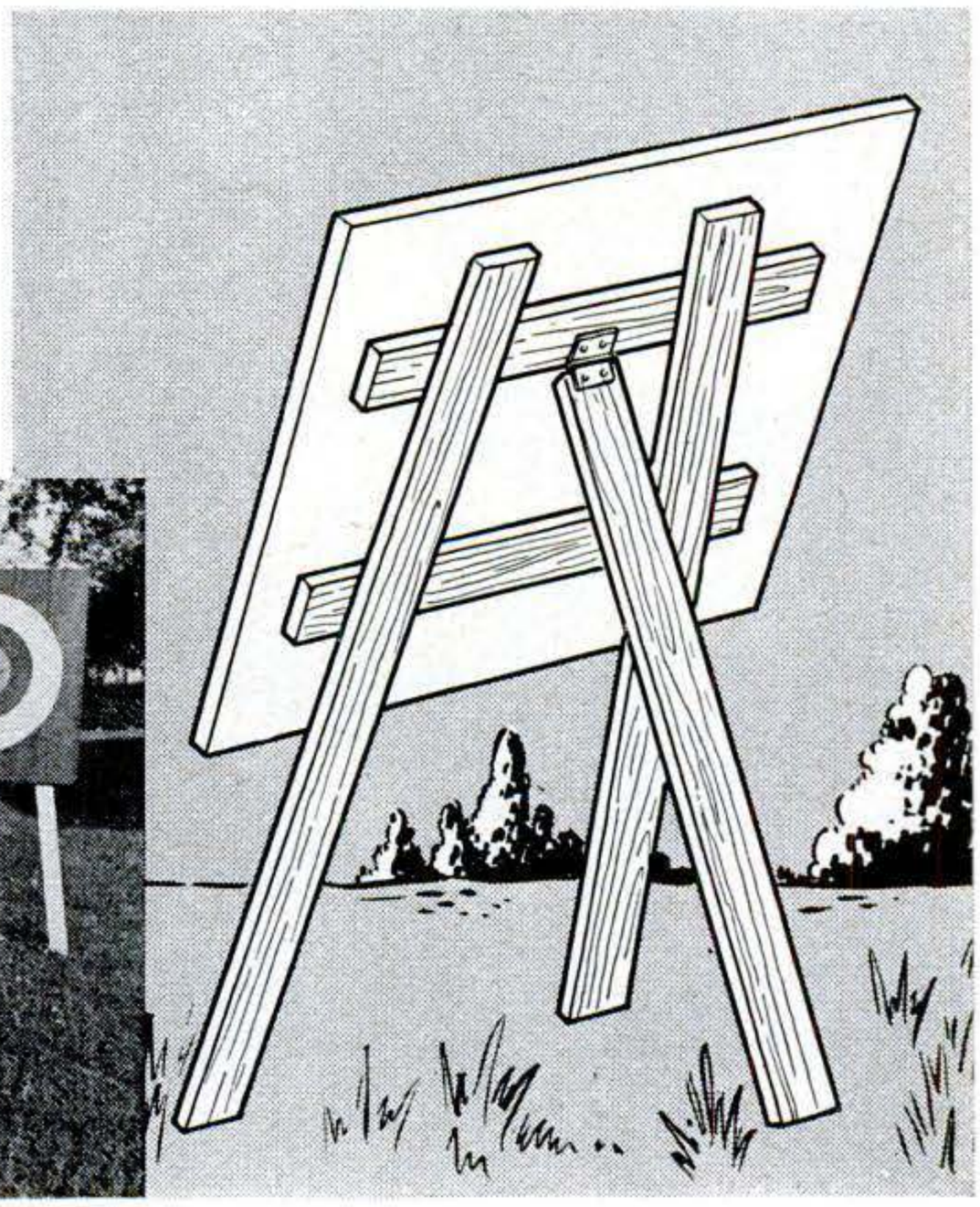
Asbestos Insulates Exhaust

ORDINARY asbestos pipe covering makes a neat, safe insulator for the exhaust manifold (arrow) of an inboard marine engine. Although the exhaust-pipe run is usually short, the bare pipe is still a potential source of burns and fire. Regular pipe covering used on home furnaces can be cut to length quickly and fastened in place with metal straps.—*Max Alth, Yonkers, N. Y.*



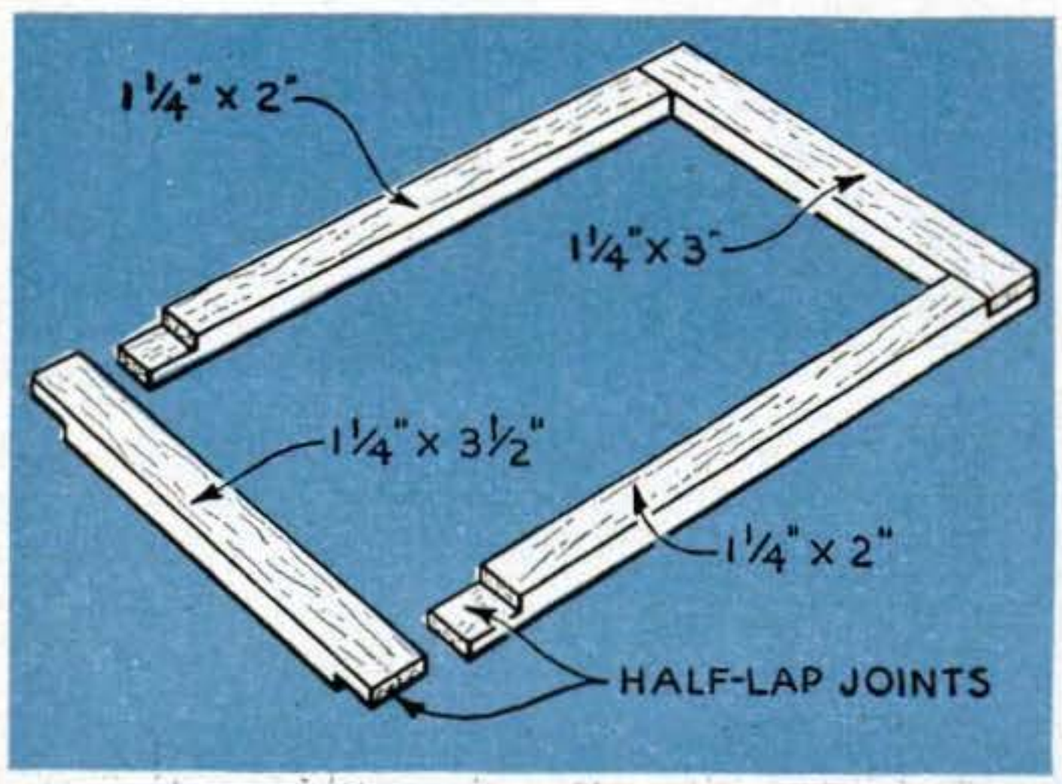
Dart Board Is Weatherproof

BUILT especially for outdoor use, the dart board pictured here can be left outside summer and winter in sunshine or rain. The 32″ square target area is asphalt fiberboard—the kind used as a liner when asbestos shingle is installed over old wooden shingles. A neighborhood contractor generally will let you have a single board for a nominal sum. The board may be nailed to a tree or the side of a garage, or mounted on an easel as shown here. The target circles are laid out with chalk or crayon and then filled in with a good grade of outdoor enamel.—*A. C. Nuessle, Newport, Del.*

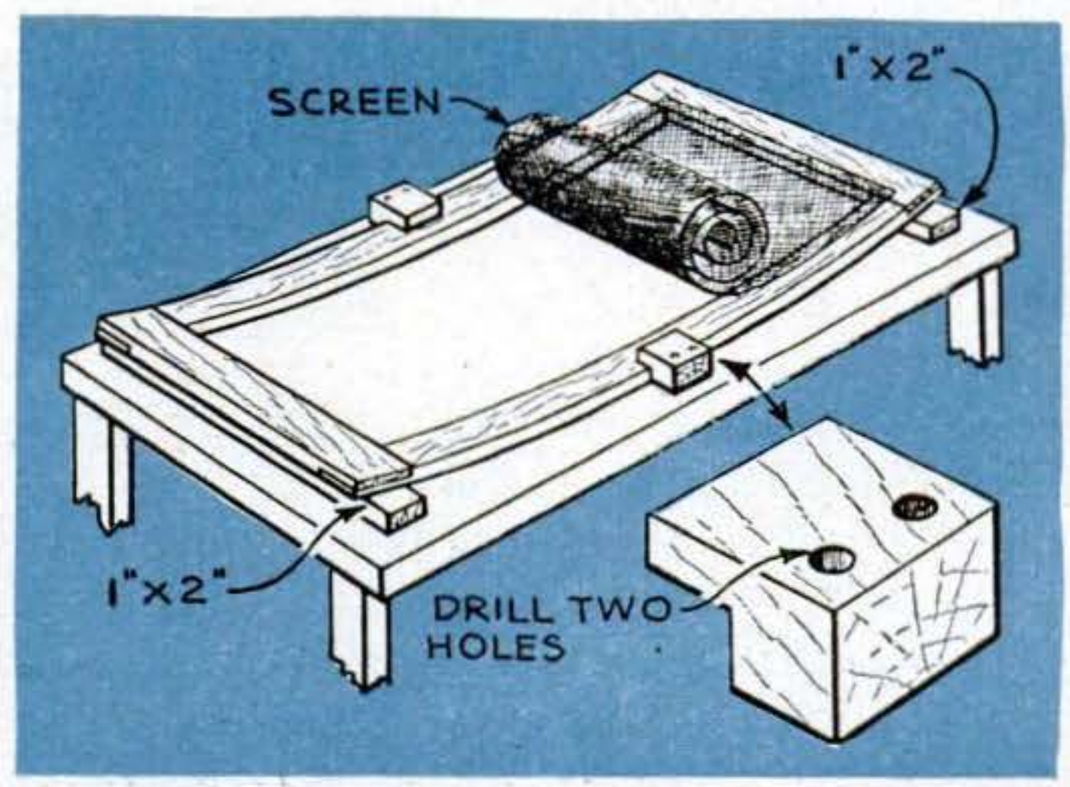


Copyrighted material

Building Your Own Screens

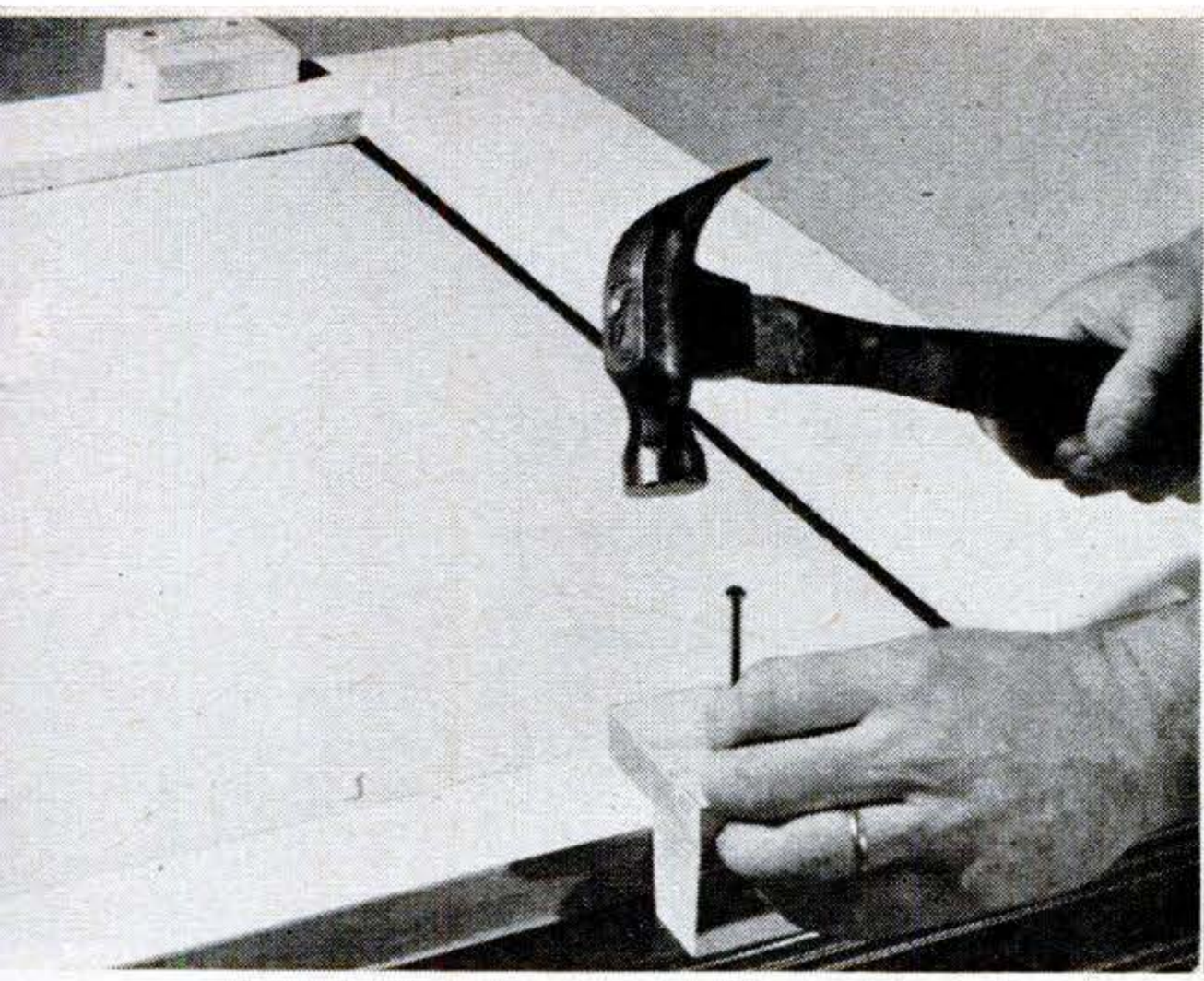


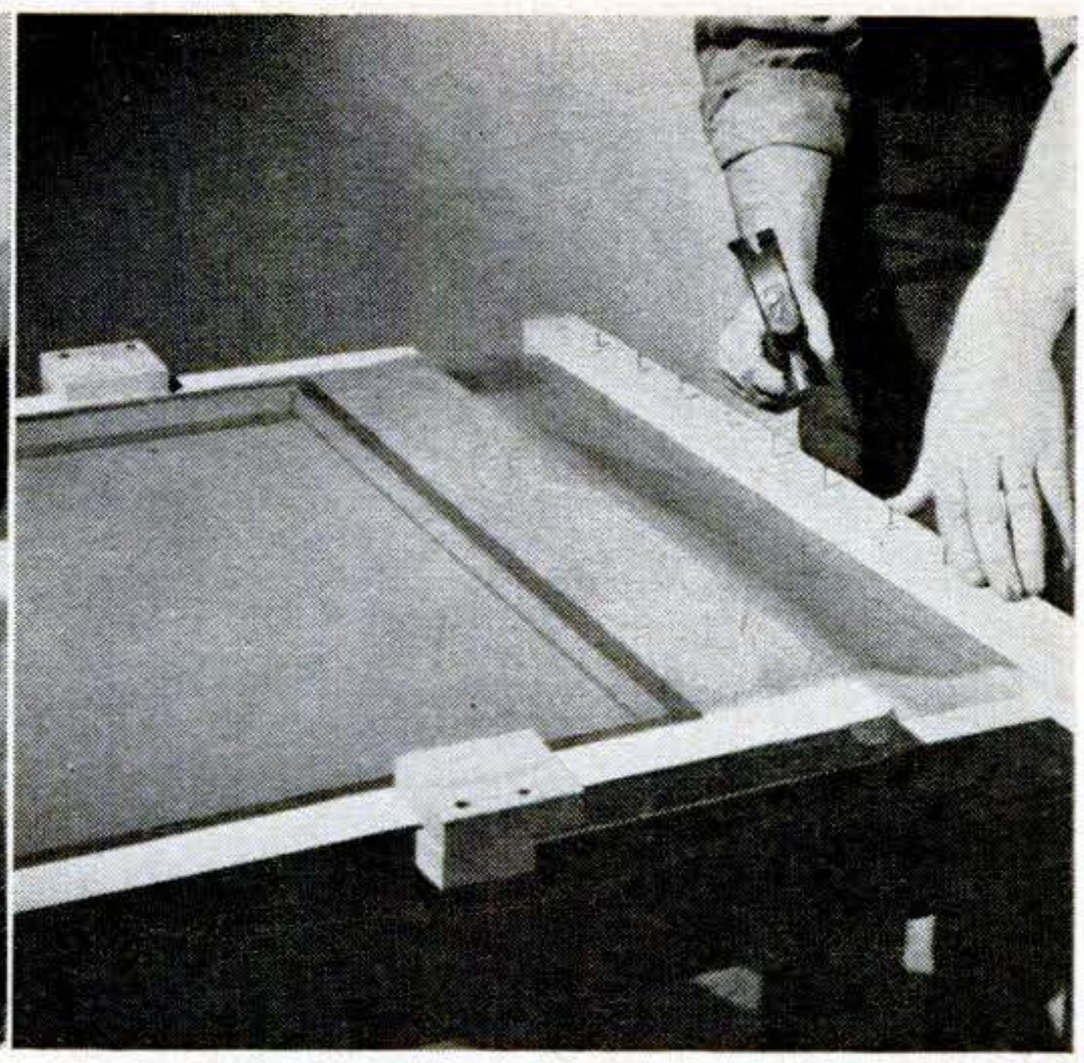
For screen frames avoid butt joints, which are temptingly easy but too weak. Half lap or mortise-and-tenon joints are much stronger.



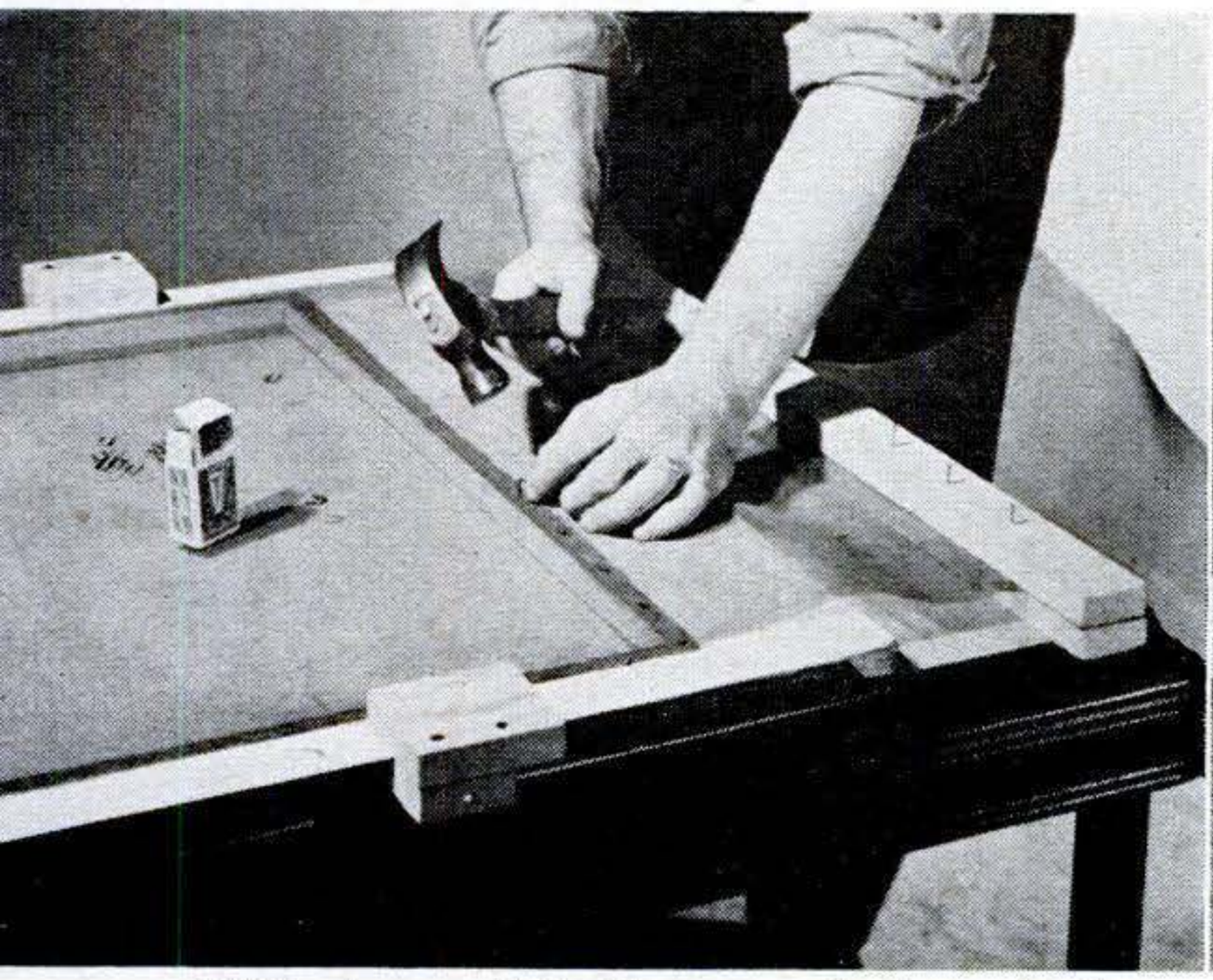
Here's one method of springing the frame to get the screening taut. Tack it at each end first, remove blocks, and tack the sides.

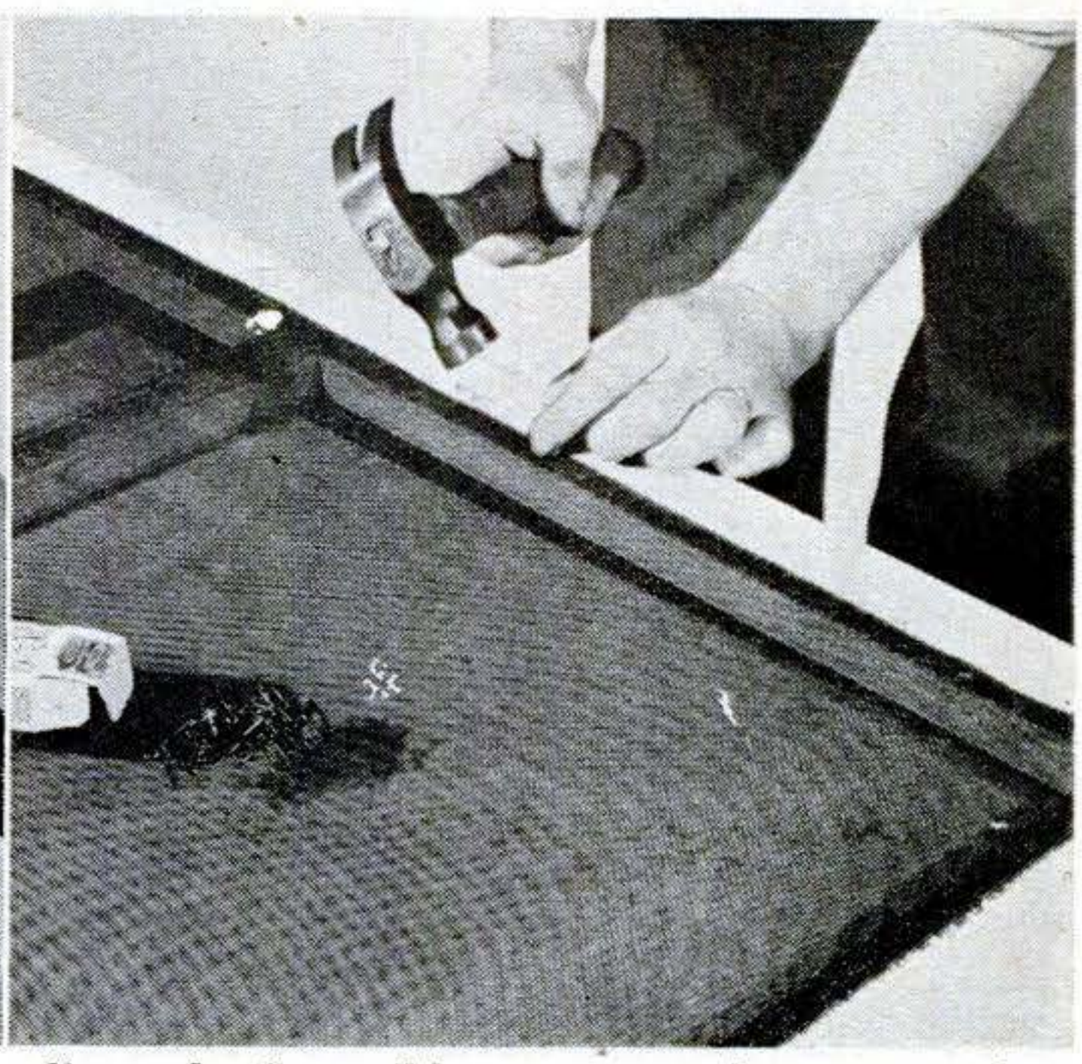
Copyrighted material





Screening also can be stretched by first securely anchoring the frame with C-clamps or wooden ones, as shown above. Tack screening at top. Then nail two strips together with the screening between. Pull the strips until the mesh is taut and nail them down temporarily.





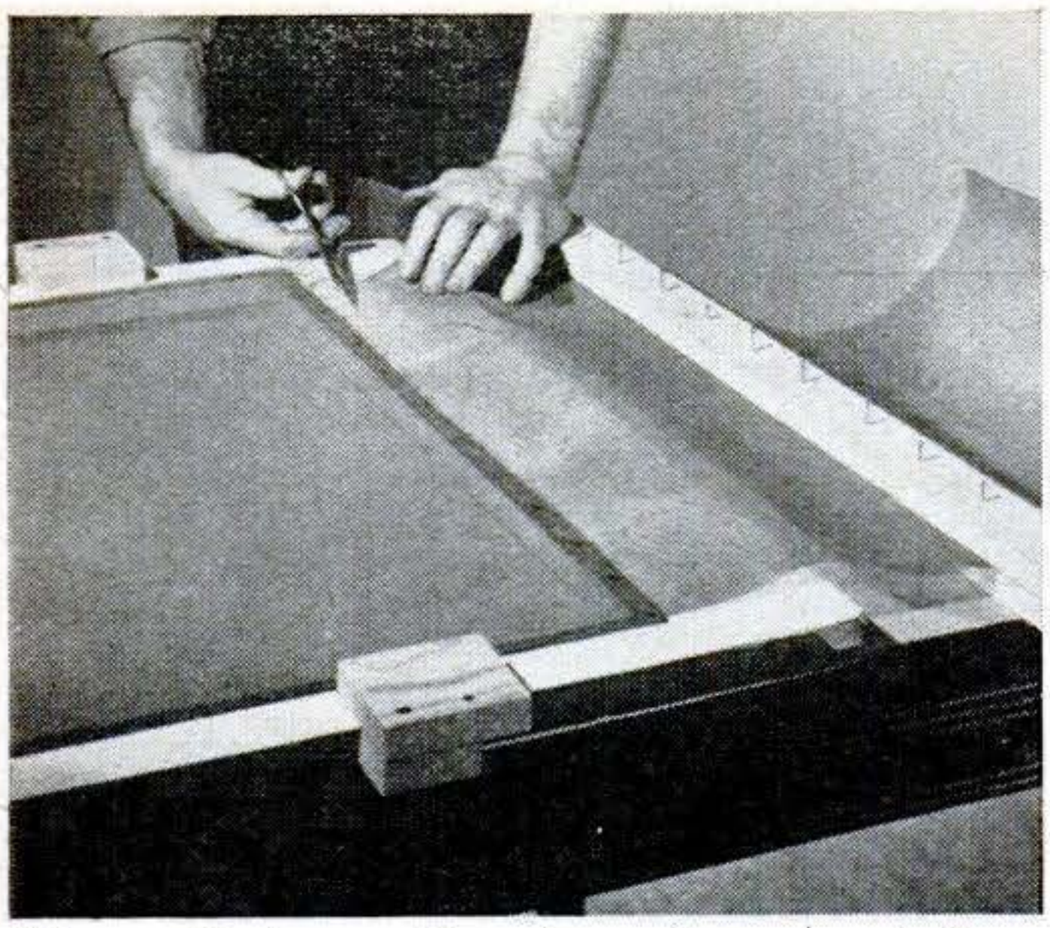
With the mesh held taut, tack along the bottom and then along the sides, as shown in these two photos. Plastic screening is easier to handle and, if you like, you can dispense with a stretching jig. Just tack it at one end, pull it tight, and tack the bottom and sides.

WITH a few simple tools and the necessary lumber, you can tailor screens to fit your windows and—just as important—save a big bite out of your budget. The tools you'll need are a hammer, saw, scissors, and perhaps a plane. Besides the lumber, you'll need tacks or staples and, of course, screening.

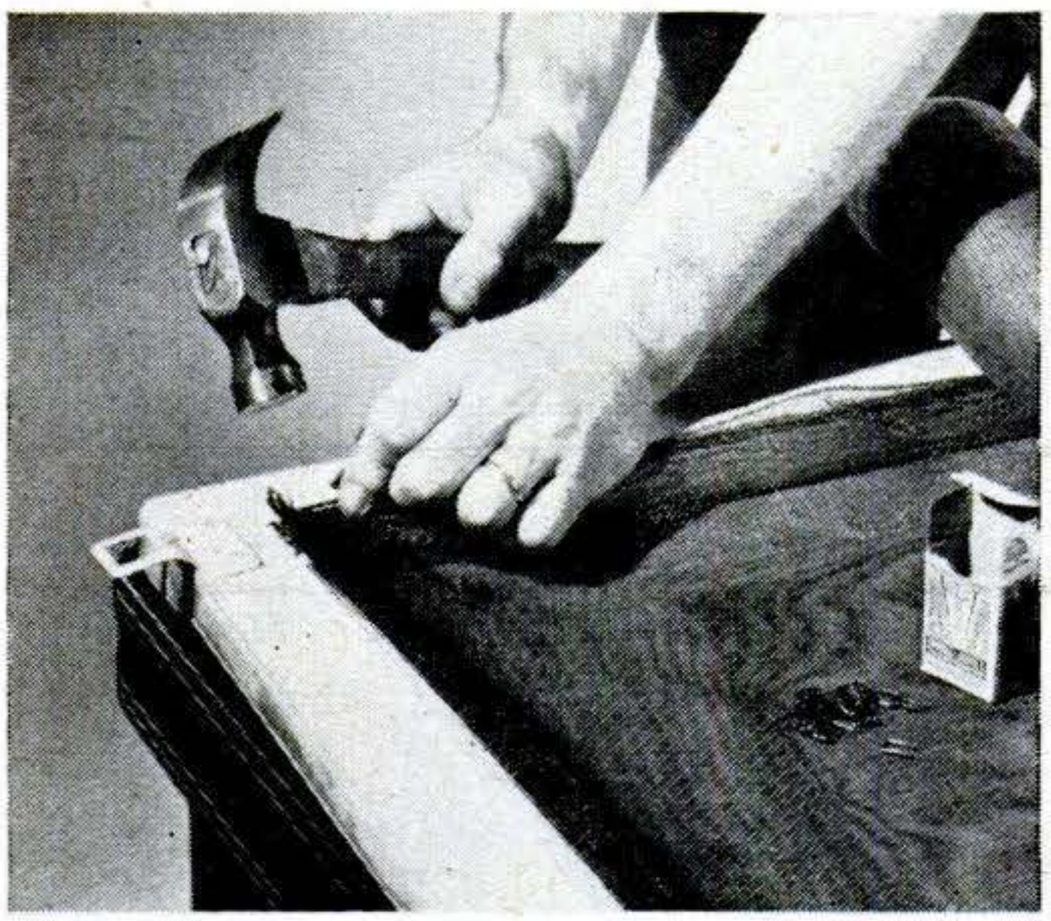
It'll pay in the long run to spend a little more on a good grade of lumber. You'll have sturdier, longer-lasting screens. White pine or redwood is suitable here. You have a wide choice of screen materials: steel wire finished with black japan, galvanized steel cloth, copper, bronze, aluminum, and plastic such as Lumite®. Here's another place where it'll pay to spend a little more. Steel wire will have to be painted from time to time and finally will rust anyway. Galvanized steel cloth will resist corrosion for a considerable time. Rust won't touch the others and they never need painting.

On the opposite page, a drawing gives you dimensions for the lumber and shows you where to saw for half-lap joints. You also can use mortise-and-tenon or miter

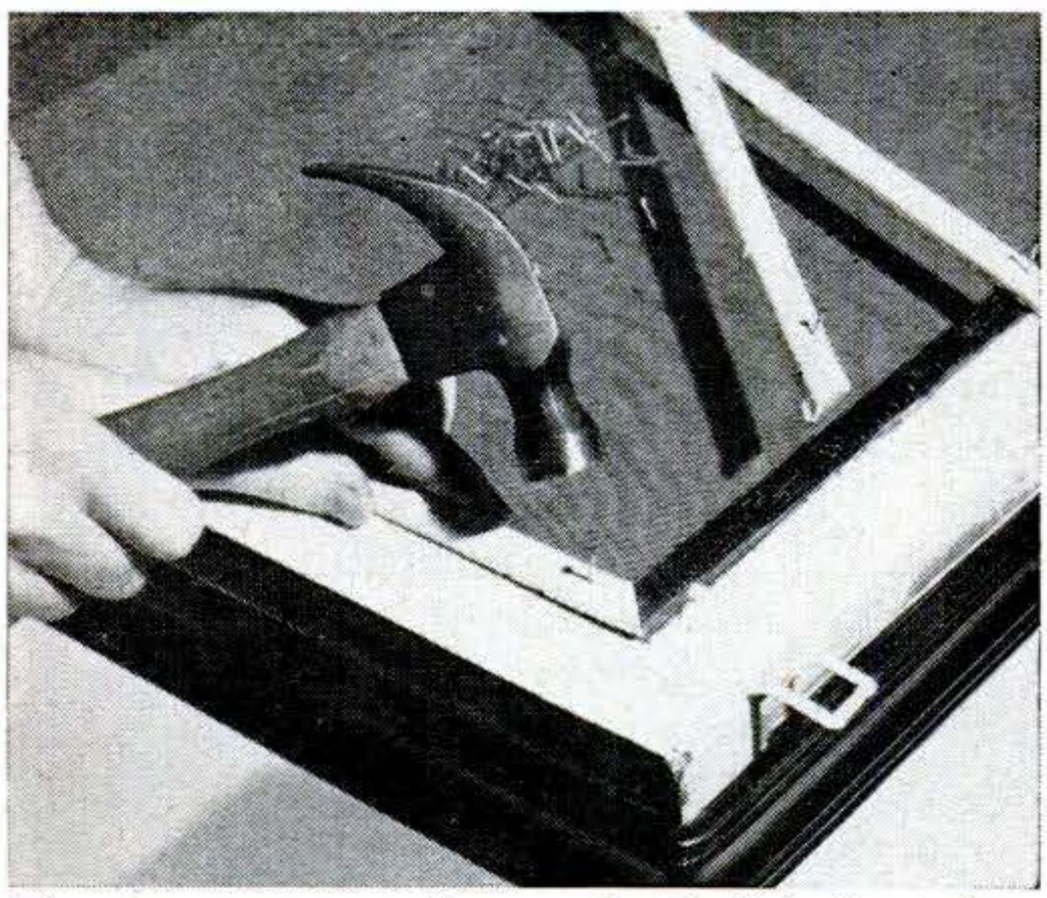
Copyrighted material



After all four sides have been stapled or tacked down, cut off the screening with shears. Ordinary scissors will cut plastic mesh.



Leave enough extra on plastic screening to let you fold over a hem almost as wide as the molding. This should be done on all cut edges.



To give your screens a finished look and to provide additional strength, tack ½" half-round molding along the edges.

joints. If the latter, strengthen them with angle irons. For accurate fits, measure each window casing before cutting the stock for the frames. Nail numbered tacks on each frame and window sill for identification. Use waterproof glue and brads in joining the pieces. By sinking the nailheads and covering them with composition wood, you'll avoid future rust stains. Sandpaper the frames smooth and try them in the casings. Plane down any uneven spots. Then apply two coats of outdoor paint.

Two ways of getting the screening on good and taut are given here. The method shown in the drawing on page 240 takes advantage of the springy nature of most frames. Instead of the notched pieces to hold down the frame, you can use C-clamps. If you do, protect the frame with a piece of scrap. After stretching and tacking the screening at both ends, remove the end blocks. The frame will spring back, stretching the screening very tightly. Then tack down the sides.

The other method—pictured on the preceding page—uses two 1" by 2" strips to pull the mesh tight. First, clamp down the frame. Then tack screening to one end. Roll the screening to the other end of the frame and hold it with the two strips as shown. Pull the strips to tighten the screening and nail the strips to the bench. Then tack across the end and along the sides. For a finished appearance and to give added support, tack ½" half-round molding along the edges, mitering the corners.

Plastic screening is somewhat easier to install since it is more flexible than the metals and can be cut with scissors. Also, it's much easier to handle than the metal. If you like, you can dispense with the stretching jig when using the plastic. Cut it to the size of the frame, allowing enough material at the cut edges to fold over a hem as wide as the molding. Tack through the hems.

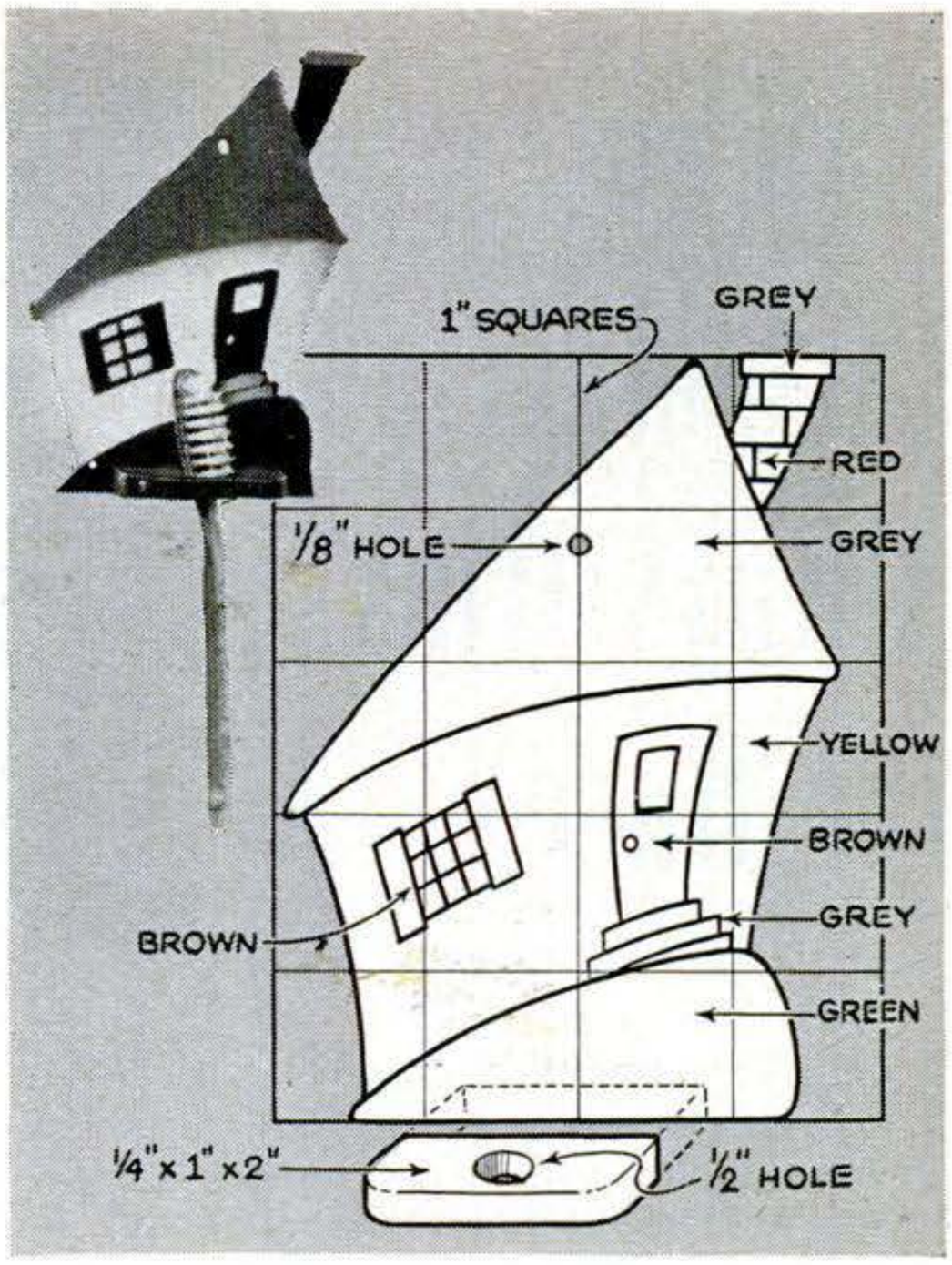
Start with one end, putting tacks or ¼" staples about 1½" apart. Then pull it tight at the other end and tack it at each corner and across the end. Do the sides last, not forgetting the hem that helps keep the screening from unraveling. Tack on the molding and the screen is ready to install.

Metal screens should be taken down in the fall and stored in a dry place. Plastic screening is not harmed by dampness and may be left up all year round. Cleaning with soapy water is all that's necessary. END

Copyrighted material

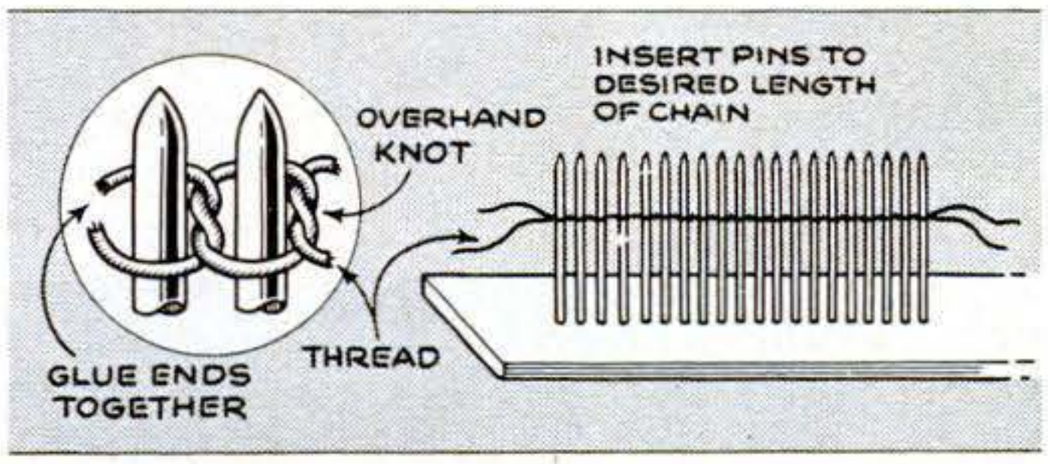
Toy House Holds Brush

THIS simple but brightly painted toothbrush holder will make a hit with most youngsters. Lay out the pattern on hard composition board or ¼″ plywood and cut it out with a coping or jigsaw. Drill a ½″ hole in a ¼″ piece of wood and nail and glue it to the bottom center. This holds the brush. Give the cutout a coat of flat white. When dry, smooth it down with fine sandpaper. Use the squares as a painting guide. Color the roof gray, the front wall a bright yellow, and the ground a jade green. Carry the colors around the sides of the board. Once these colors are dry, you're ready to paint in the other parts. Use either gray or brown for the window and gray for the steps. Make the chimney a bright red with a gray toppiece. A pen is handy to paint in the window frames, the door, and the steps, and to outline the bricks of the chimney.



Telescope-Microscope in One

BUILT of lightweight aluminum-alloy tubes, this 60-power telescope does double duty as a microscope. When the five tubes are collapsed, the four lenses are positioned automatically for use as a microscope. The eyepiece is adjustable for magnifications of 15, 30, and 60 times. When fully extended, the 'scope is 33″ long. It's priced at $4.50 by Brownscope Mfg. Co., New York City.



Thread Makes Model Chains

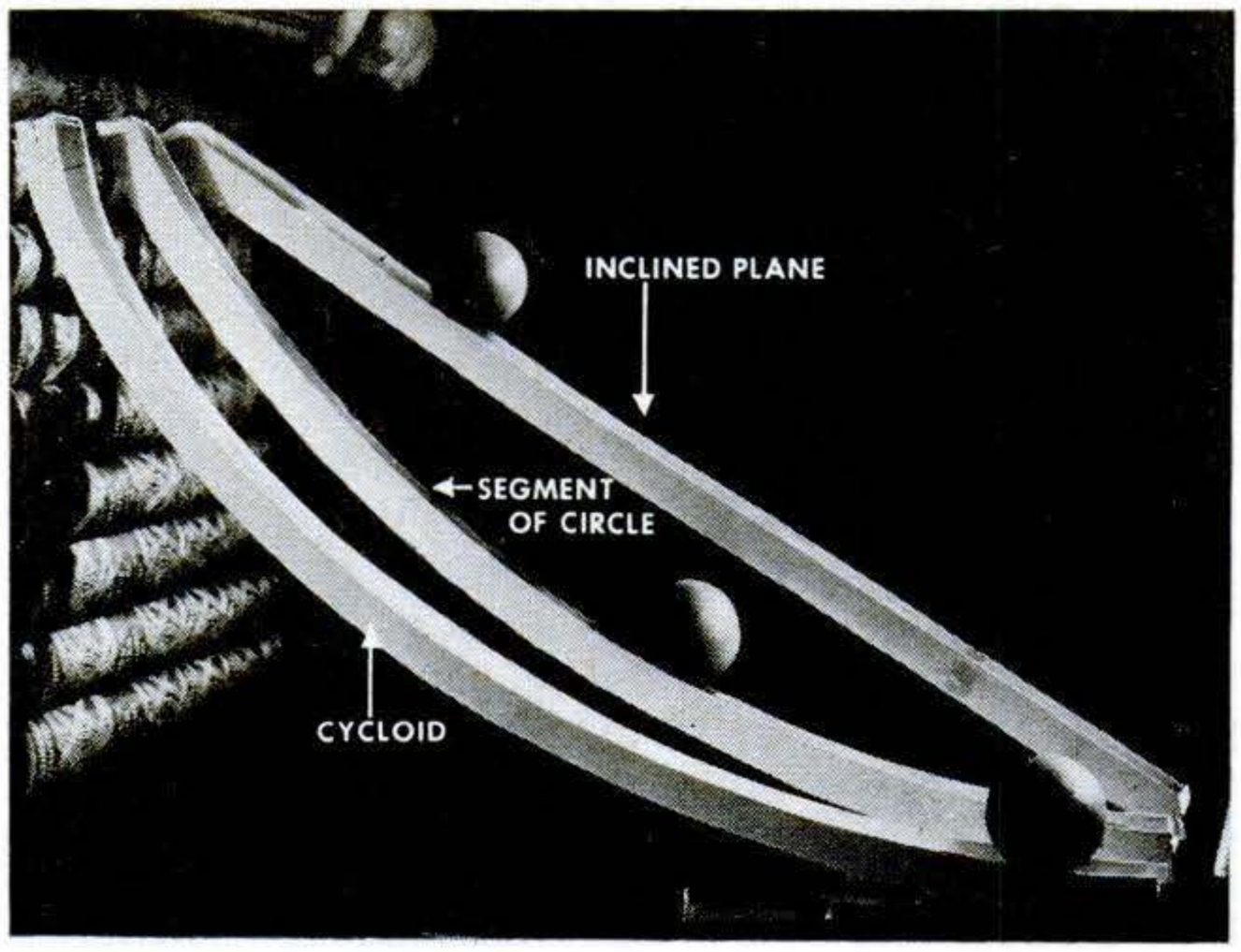
BLACK thread can be knotted into excellent imitations of chains for ship models. I first stick a row of pins through a piece of cardboard. Then I tie an overhand knot around each pin, as shown in the drawing. To finish the chain, glue the ends of the threads together and slip the chain off the pins.—*Jorgen A. Jorgensen, Storrs, Conn.*

Wheel Measures Trails

NEEDING a quick way to measure the roads, land, and hiking trails at my Maine fishing camp, I built the wheel pictured here. The circumference is 7½′. A revolution counter on the hub keeps tabs on the distance covered. To use it, a man just pushes the wheel ahead of him as he walks along.—*Chief Stanwood, Tunk Lake, Me.*

Copyrighted material

Ball on Cycloid Track Always Wins the Race

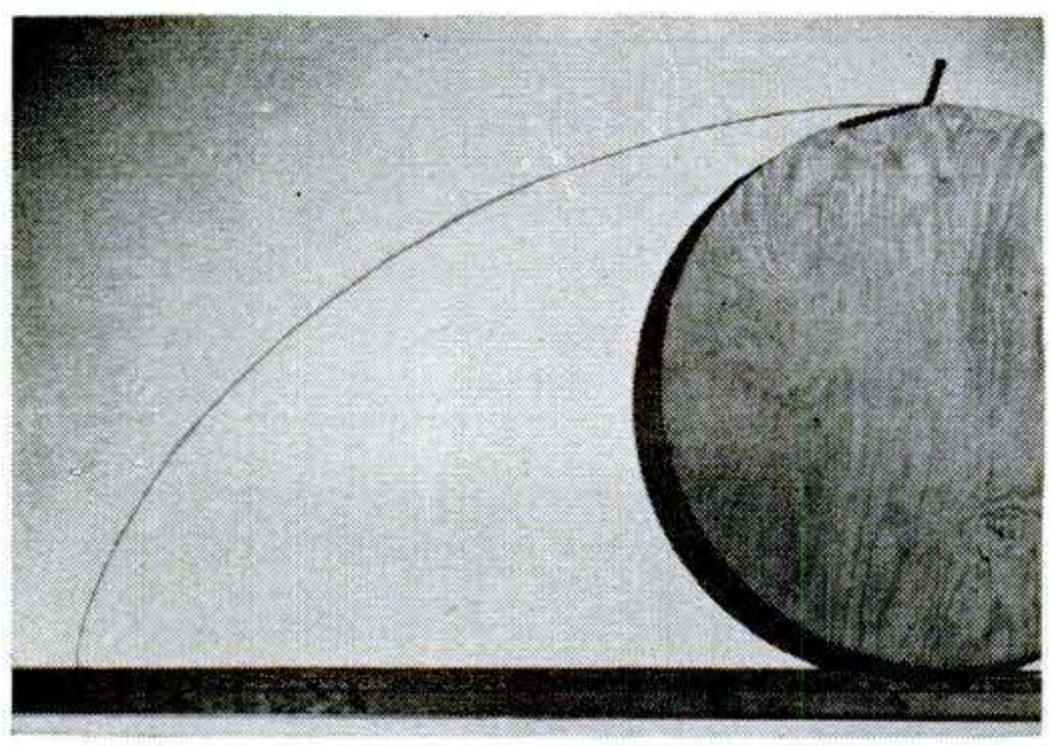


HERE'S a scientific puzzler. Like a free body falling vertically, a ball rolling down an inclined plane accelerates at a uniform rate. As Galileo demonstrated, the distance travelled is proportional to the square of the time of descent.

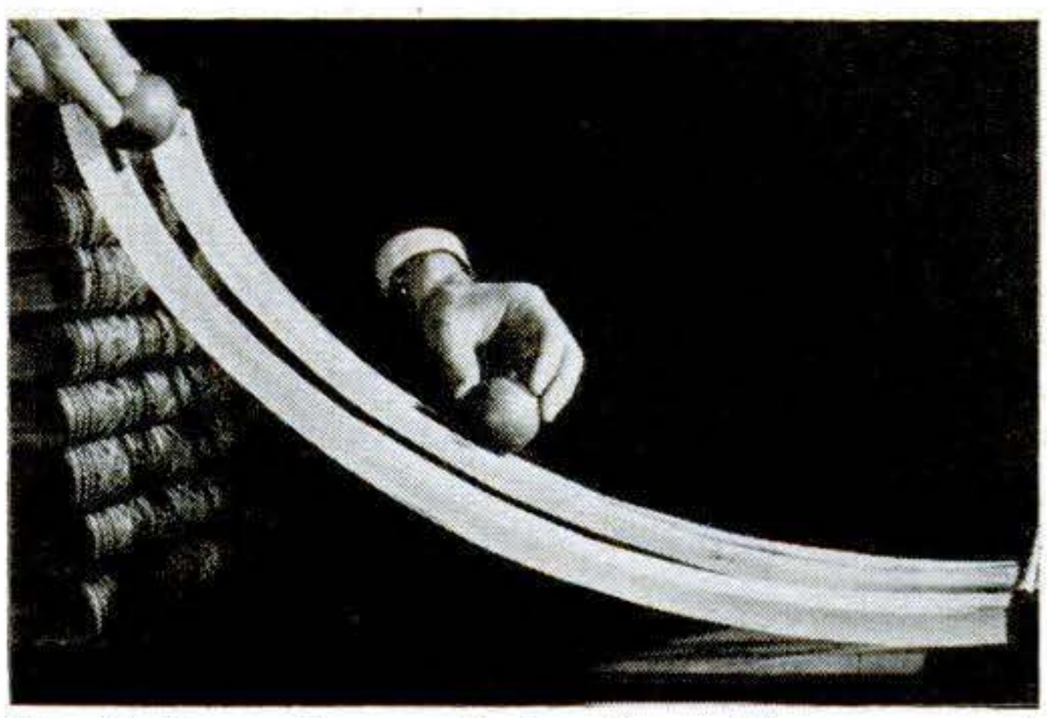
But this natural law no longer holds if the ball rolls down a curved path. If the track is concave, the ball accelerates most at the beginning of its fall. If the curve takes the form of a cycloid, the ball will reach the lower end sooner than it will the end of any other inclined track of equal horizontal distance.

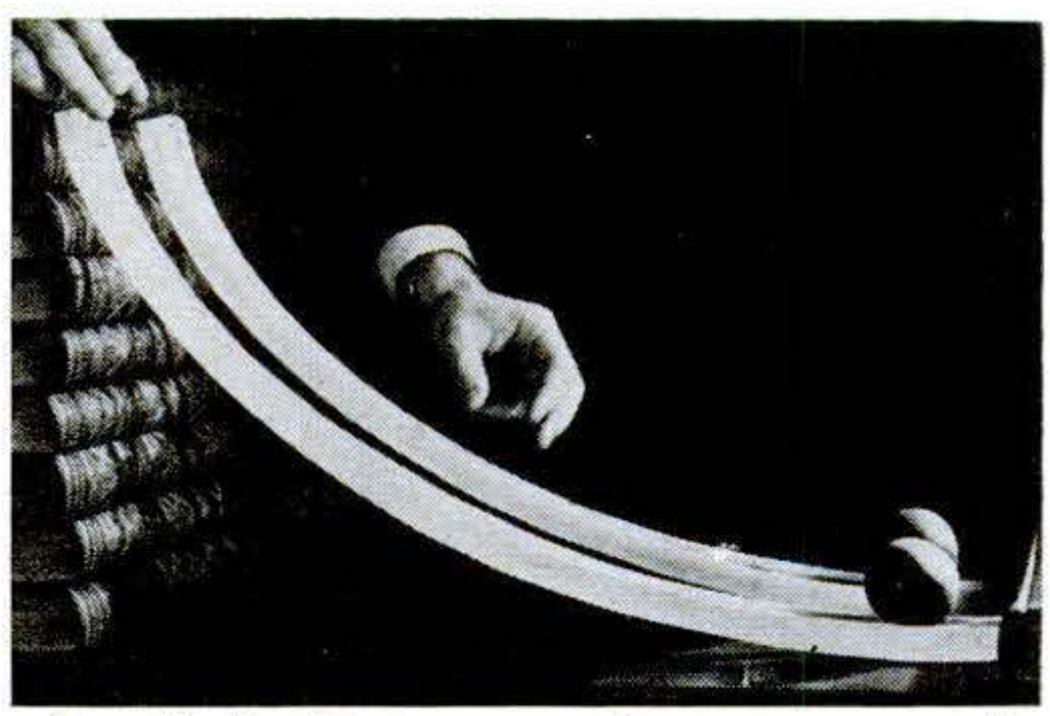
You can demonstrate this by setting up the race illustrated at the top of the page. Make the tracks of heavy cardboard, plywood, or wire. One path is a simple inclined plane, another a segment of a circle, and the third a cycloid.

According to the dictionary, a cycloid is a curve traced by a point on the radius of a circle rolling in a plane along a line in the plane. But don't let that confuse you. It's simple enough to lay out the half of a cycloidal curve you need. The photo below shows how it can be done.—*Kenneth M. Swezey, Brooklyn, N. Y.*



You can lay out a cycloid in this way. Tape a pencil to the edge of a large disk. Place the pencil and disk against a yardstick. Then roll the disk along the stick without slipping.

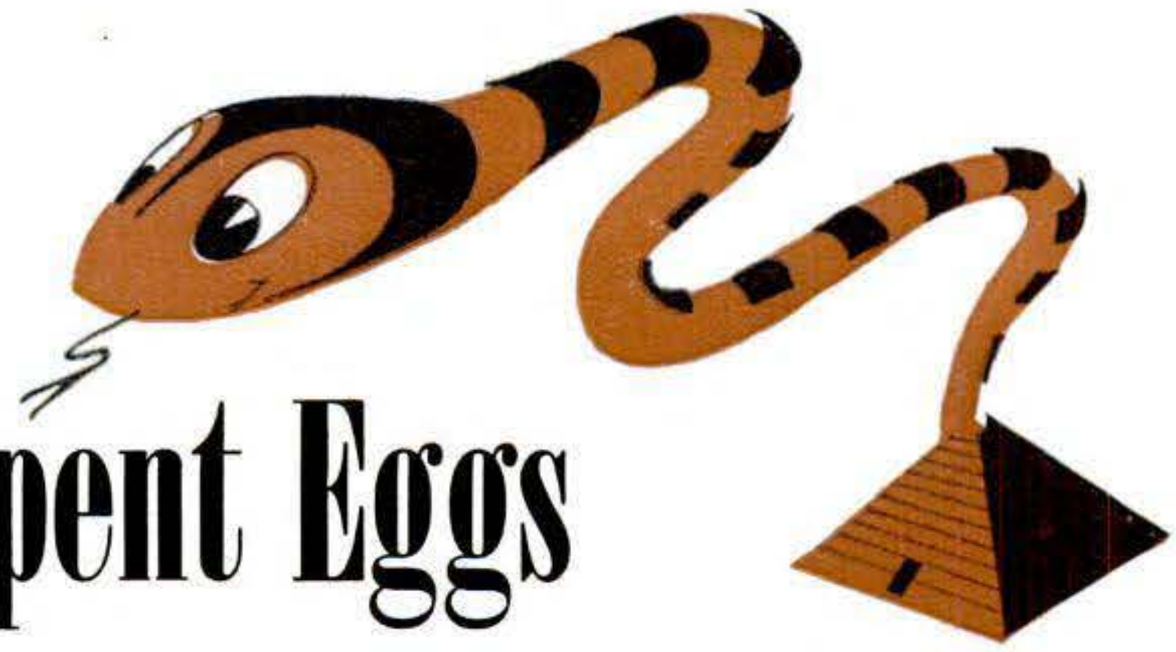




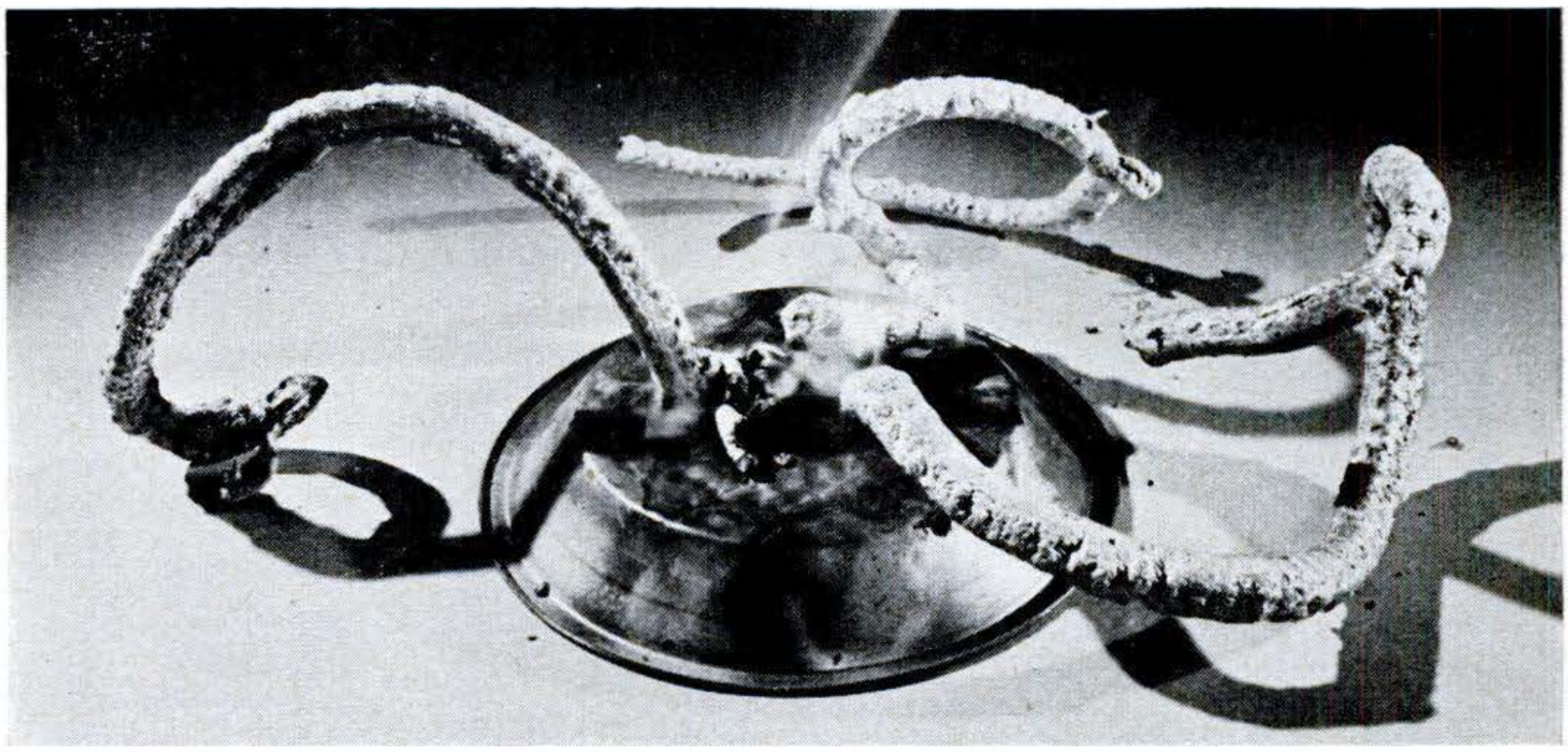
The ball catches up! Another odd property of a cycloid is seen here. Roll balls down identical cycloids. No matter where you start the balls, both reach the bottom at the same time.

Copyrighted material

How to Make Pharaoh's Serpent Eggs

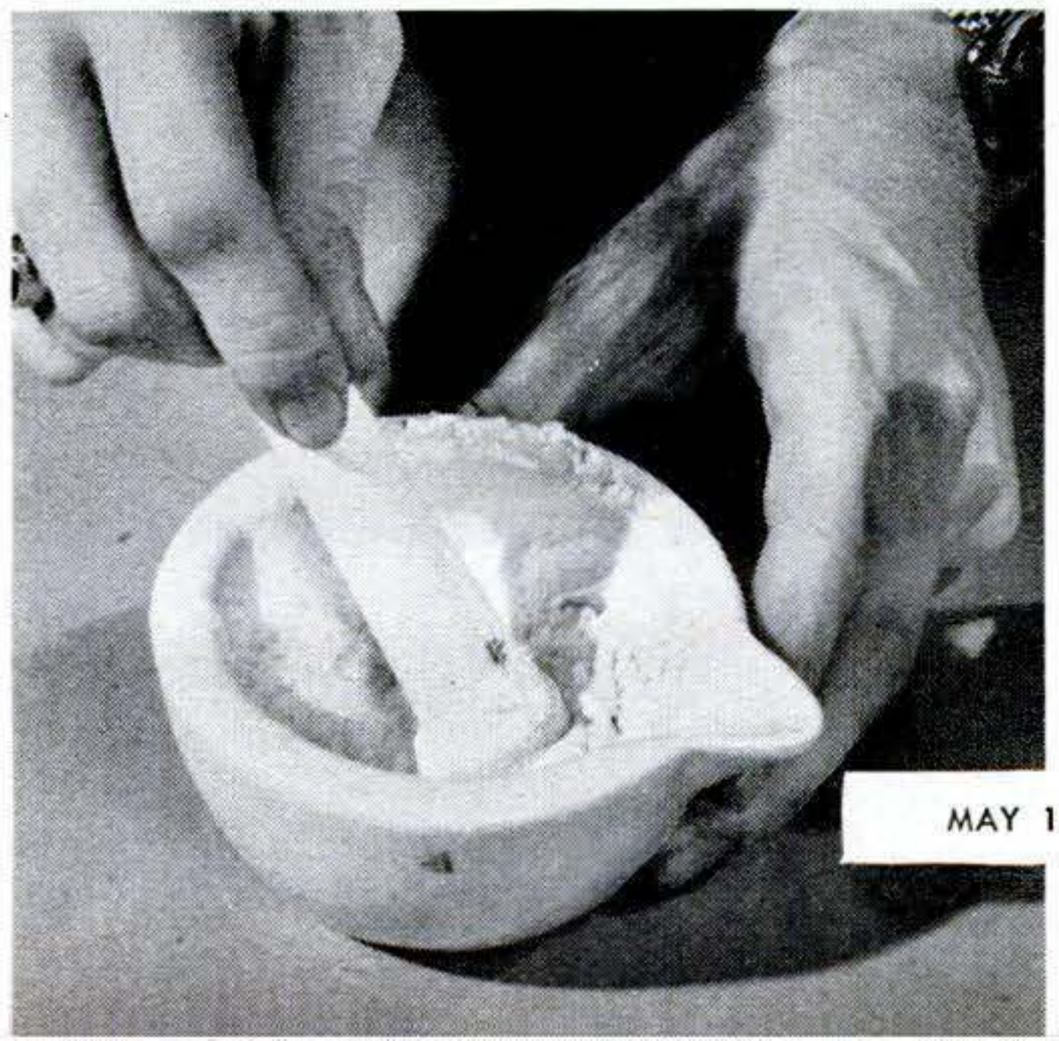


CHIEF ingredient of these serpent eggs is mercuric thiocyanate. You can buy it at chemical supply houses, or you can mix your own. Either way, wash your hands after handling it. It's poisonous. To make it, add several drops of ferric chloride solution to a saturated solution of mercuric nitrate. (It's poisonous, too.) Then add, little by little, a saturated solution of potassium thiocyanate to the mercuric nitrate, stirring constantly. A grayish precipitate will form. Keep mixing and stirring. The solution will turn red. Let it stand 30 minutes. Filter the solution. Wash the precipitate on the paper with cold water. Let it dry on the paper. To make the eggs, moisten the dried mercuric thiocyanate with water containing a pinch of potassium nitrate and a little mucilage. Mold the eggs to shape and let them dry.

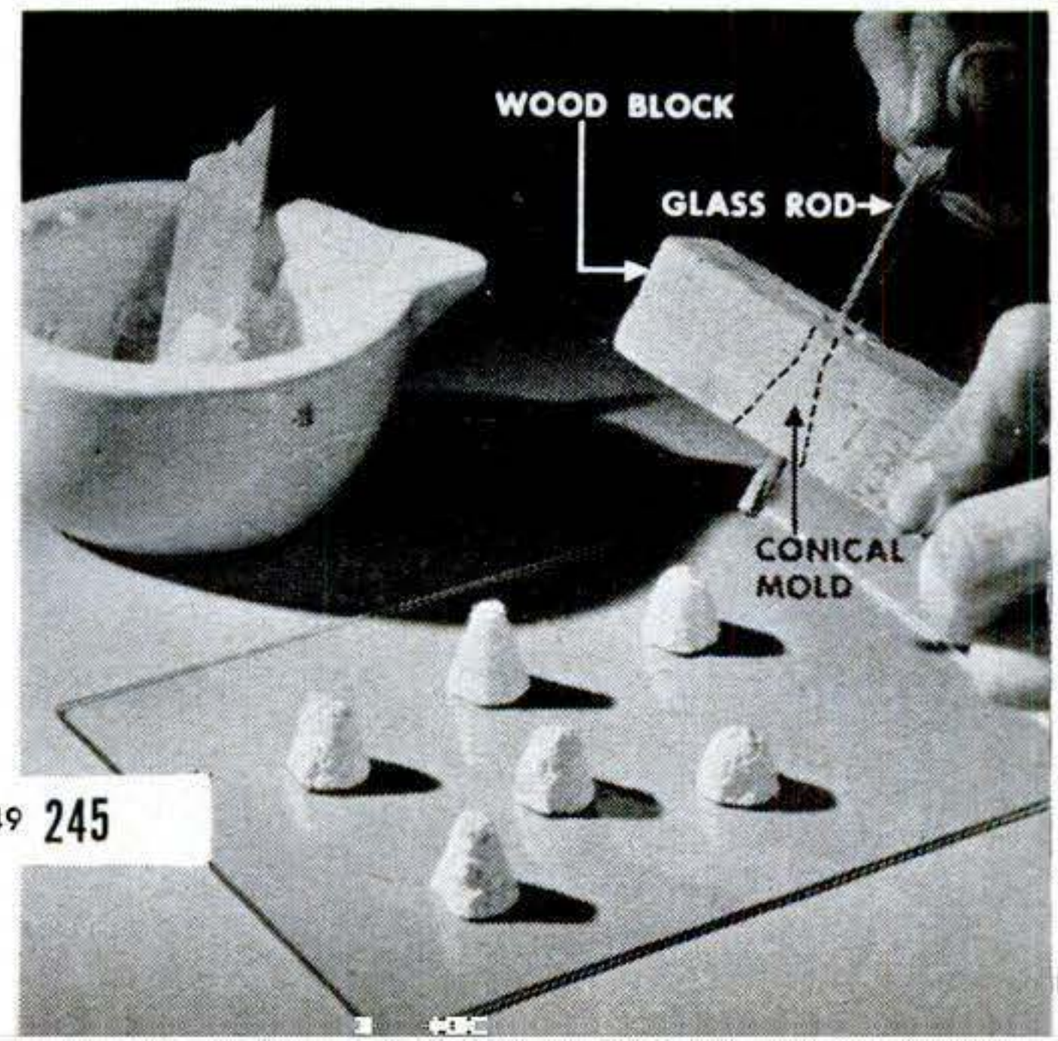


Here are four Pharaoh's serpent eggs in action. Ash is about 50 times longer than the eggs.

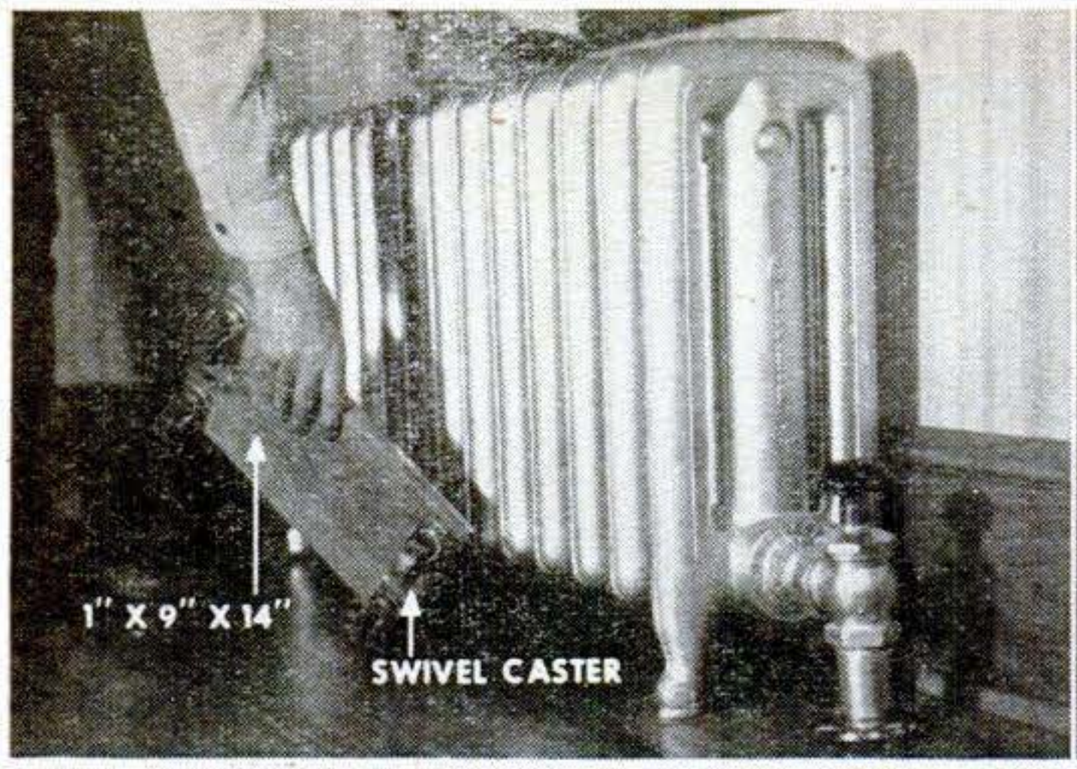
Add mucilage and pinch of potassium nitrate to water and moisten dried mercuric thiocyanate.

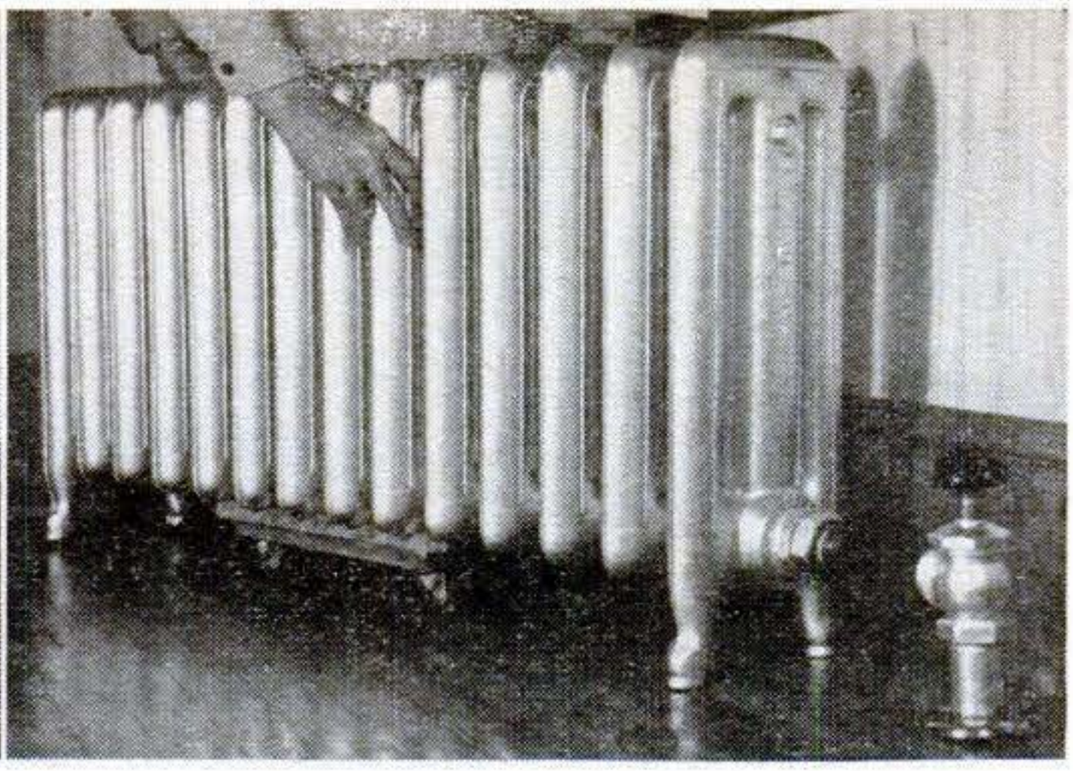


Drill and countersink conical mold for eggs. Hole permits eggs to be pushed out with rod.



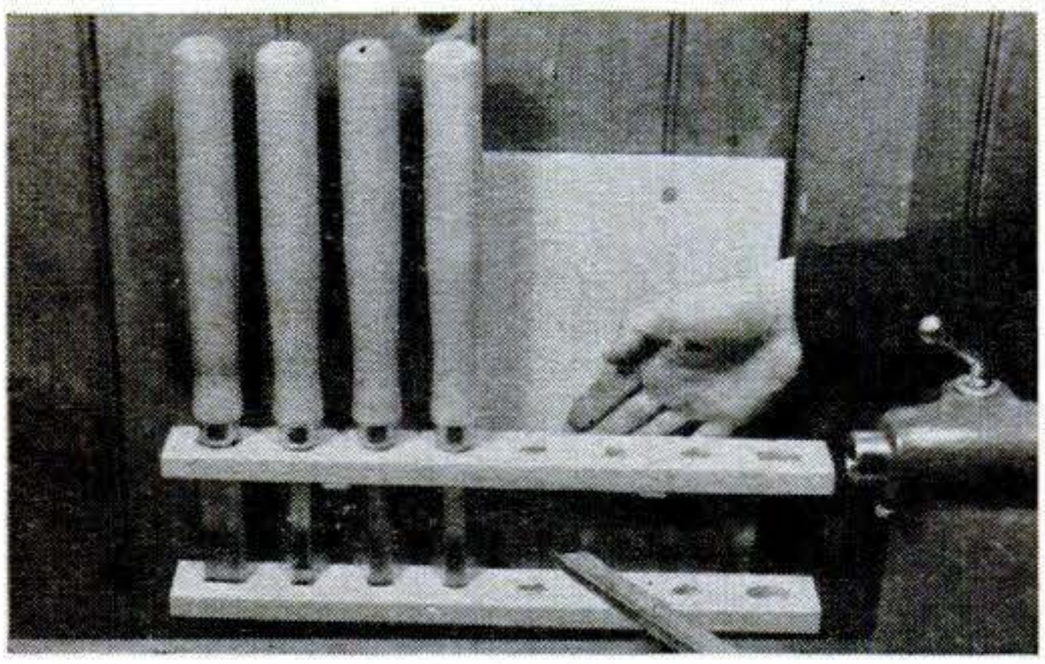
ted material





Homemade Dolly Helps You Move Furniture

You'll find many uses around your home for a small dolly. Simply attach four swivel casters to a rectangular piece of wood, about 1″ by 9″ by 14″. With this, I've handled a 300-lb. radiator quite easily. By building up the height with scrap boards, you can move just about any piece of heavy furniture. Use ball-bearing casters, preferably with nonmarring wheels.—*O. C. Grant, Springfield, Mass.*

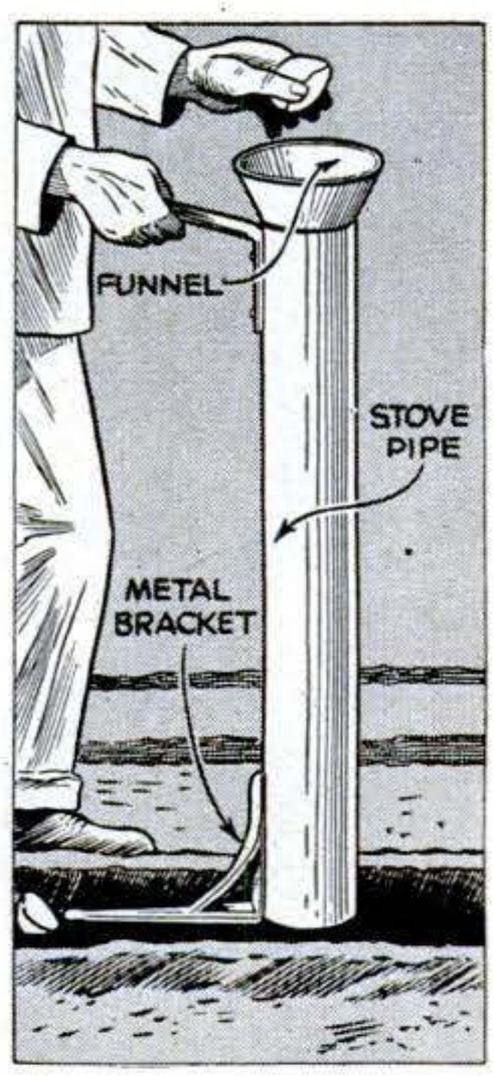


Chisel Rack Lets Chips Fall

A chisel rack is handy right behind a lathe, but there it collects a mess of chips and shavings. If you space the rack about 1″ away from the wall or backboard, the chips simply fall past it to the floor.—*Robert Hertzberg, Jackson Heights, N. Y.*

Seed Potatoes Evenly Spaced

If you've ever planted potatoes by hand, you know it takes a lot of stooping to do the job right. Here's a trick that enables you to plant them quickly and still avoid an aching back. Sling a bag of cut potatoes over your shoulder and drop them down the pipe, one by one, moving the planter forward each time a distance equal to the spacer on the bottom.



New Holder Allows You to Change Plates Easily

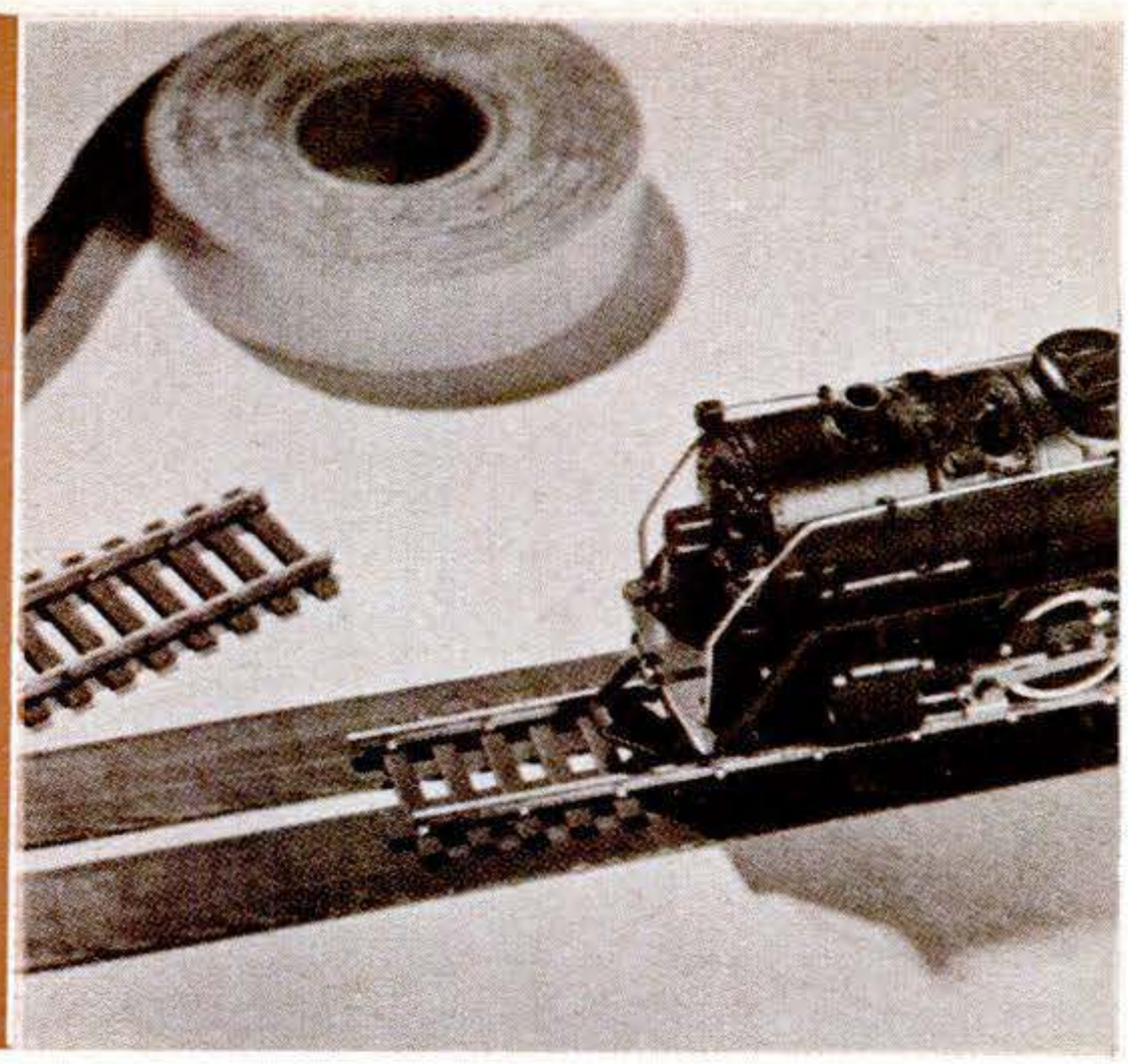
License plates are kept secure but you can change them easily if you use a new type of holder put on the market by the Ajay Specialty Co., of Newark, N. J. An aluminum frame for the plate is also provided.

The holder itself consists of two main parts, each with a retaining lip along one edge. One is bolted to the license bracket. The other slips through a slot in the first and is held in place by two springs. The pull of the springs also holds the framed plate in place between the two lips. Holder and frame sell for $4 a pair.

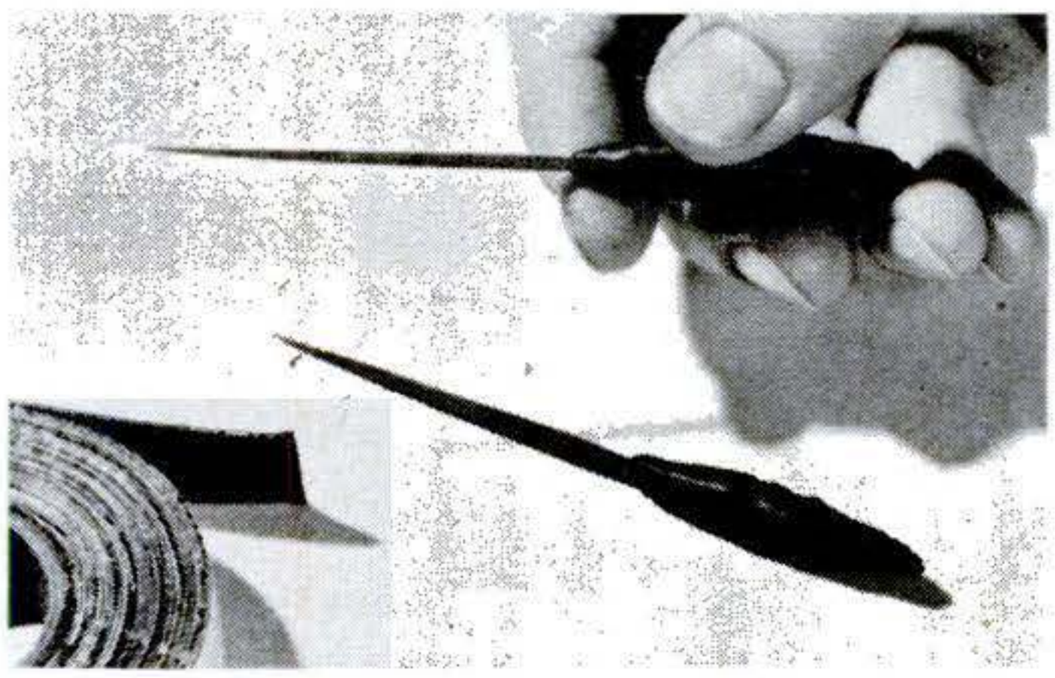
Copyrighted material

Fix It with Rubber Tape

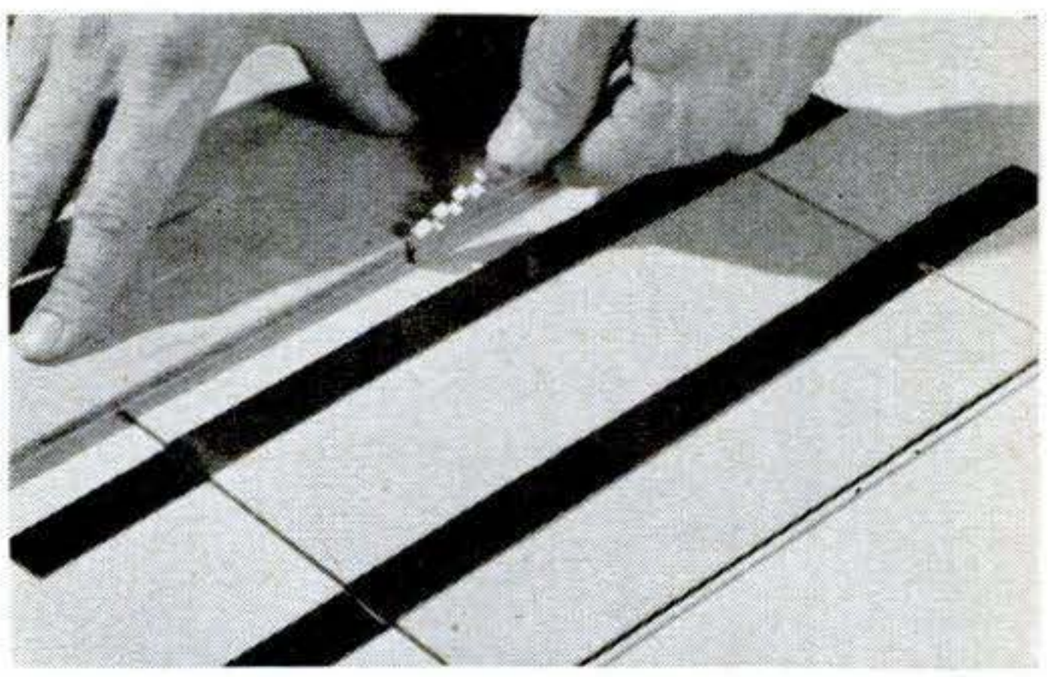
Scale down train noises. Model railroads laid on plywood may be noisy, or have a rattly, unrealistic sound. A rubber-tape roadbed under the track may help on both counts.



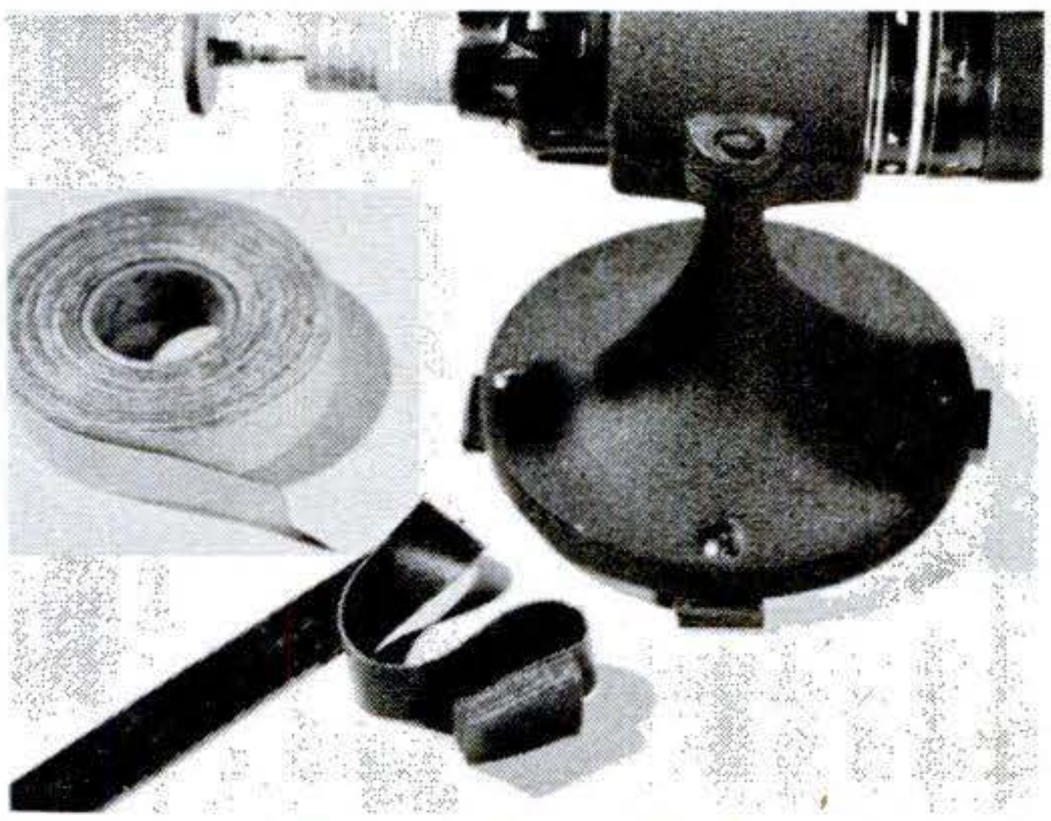
Do you keep electrician's rubber tape in your tool kit? Chances are you have the thin, black, tarry friction tape that's everybody's patch-all. But the other kind, a thick, live, stretchable strip, is handy too. Pull off the cloth backing, and you have a surface that sticks stubbornly to itself. The soft rubber hugs whatever you wind it on. Here are some uses for the stuff that have nothing to do with kilowatts.



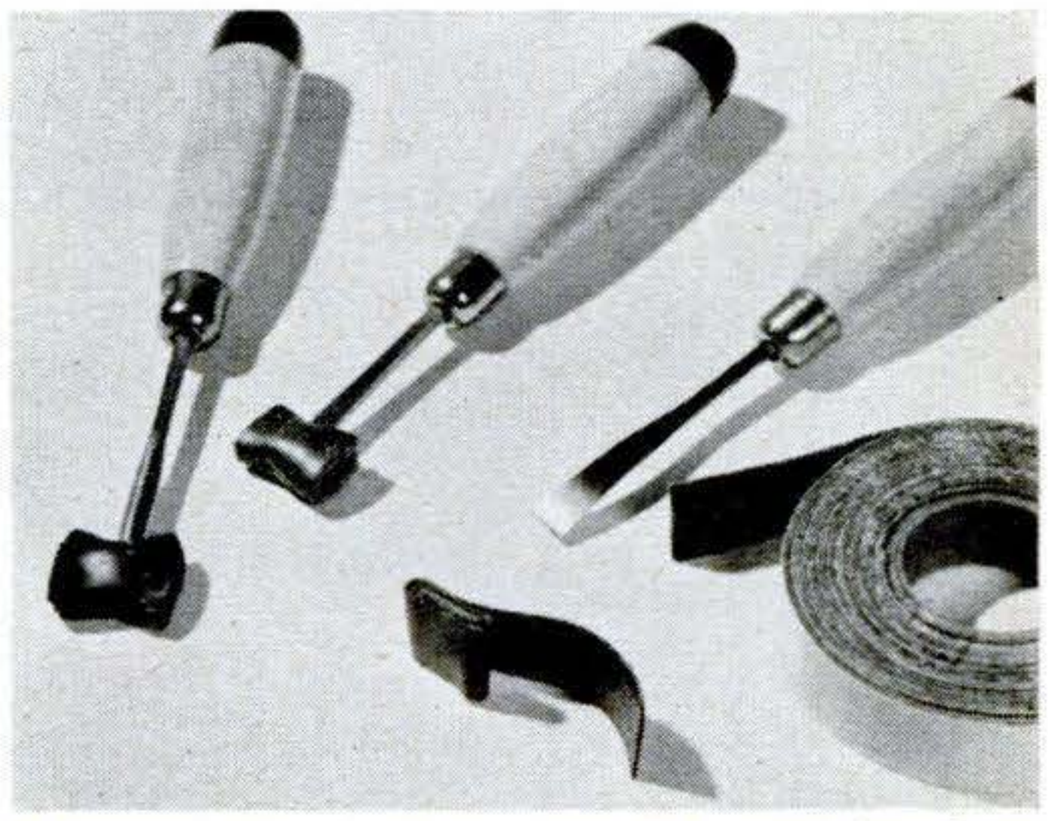
Give your fingers more room by wrapping handles on the shanks of fine jeweler's files.



Glass won't slip under the cutter if you lay it on strips of rubber tape stretched on the bench.

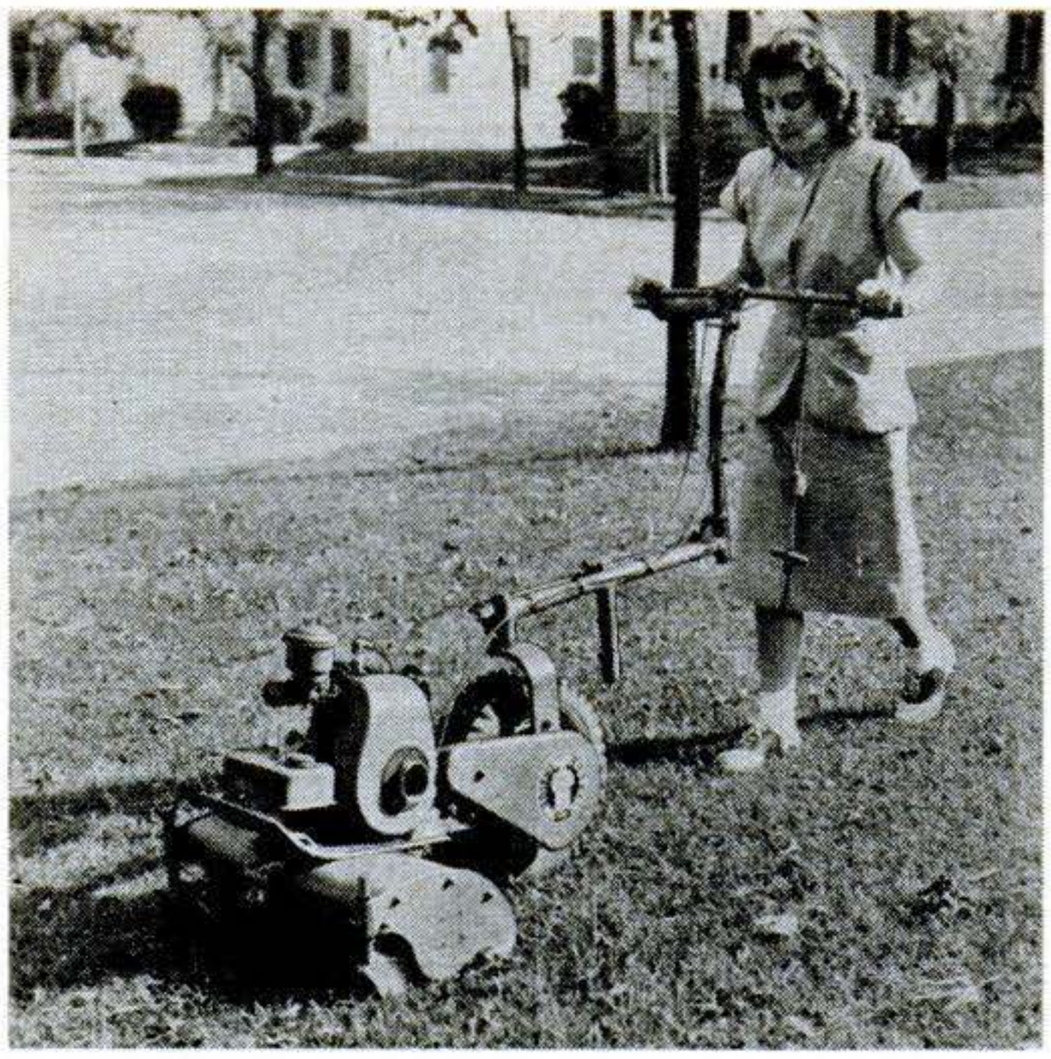


Folded tape pads under small power tools cut down vibration and creeping. Fold to several thicknesses and punch holes for mounting.



Preserve keen edges on fine woodworking chisels and carving tools by pushing on wads of tape. This helps prevent rusting too.

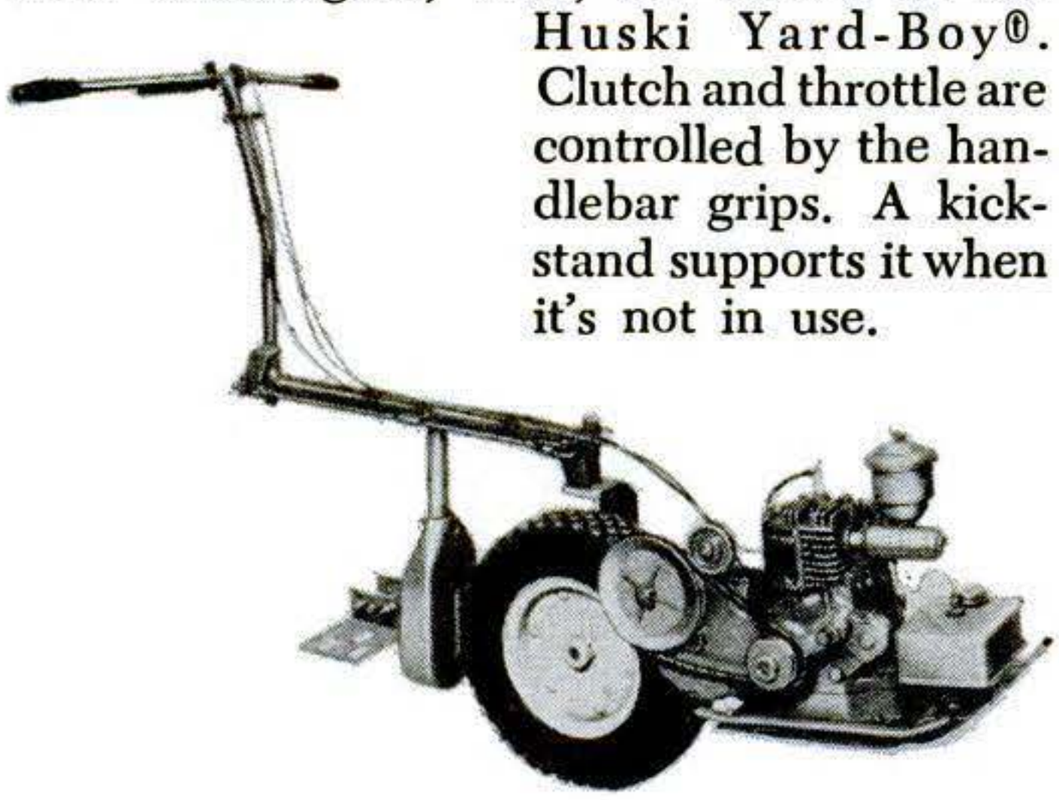
Copyrighted material

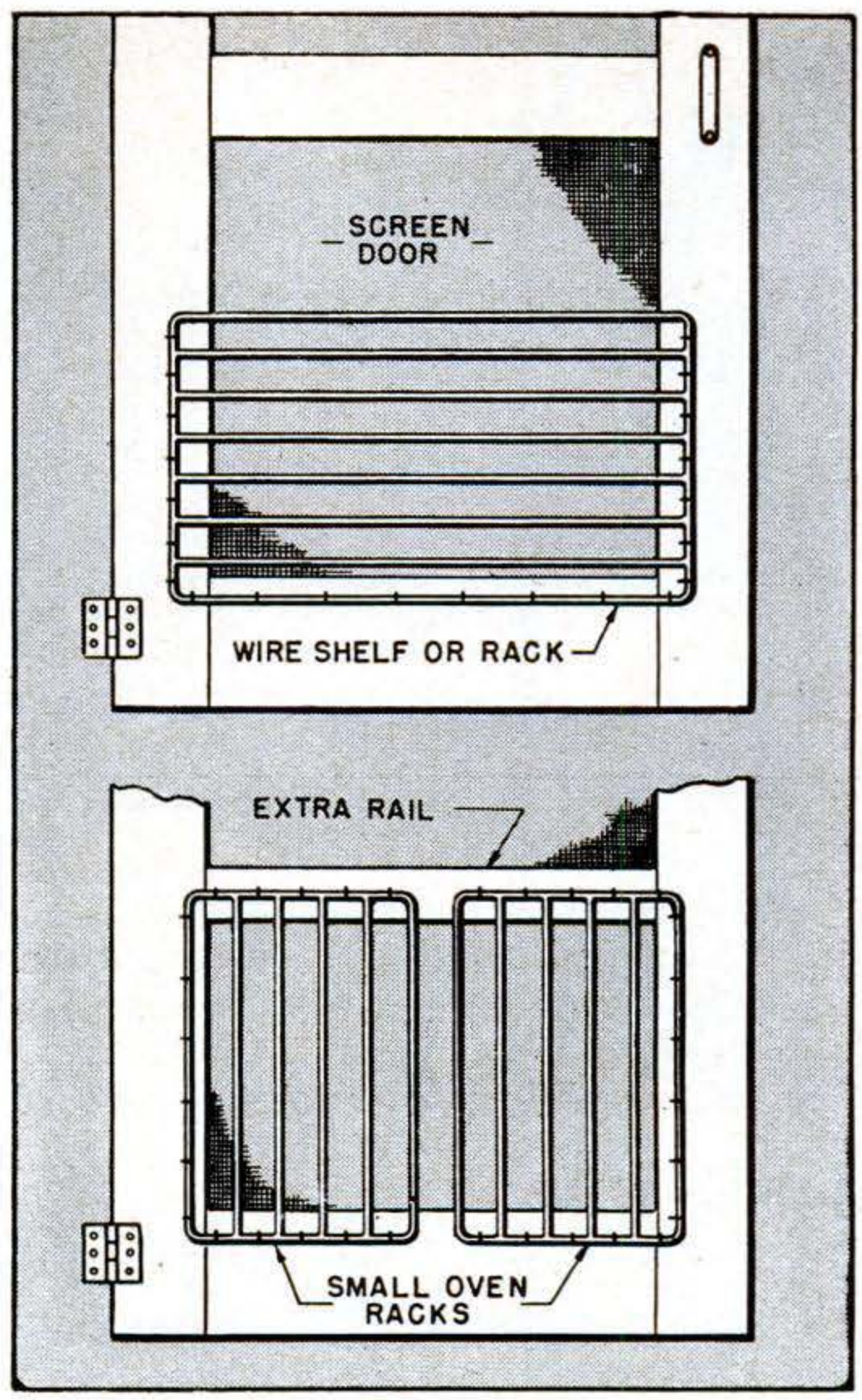


Yard Tractor Has One Wheel

BESIDES mowing your lawn, you can plow and cultivate your garden with this small gasoline tractor. Although it has only one wheel, it balances easily and steers by pressure on the pivoted handlebar. No tugging or lifting is required.

Made by the Bolens Products Division, Port Washington, Wis., it's known as the Huski Yard-Boy®. Clutch and throttle are controlled by the handlebar grips. A kickstand supports it when it's not in use.



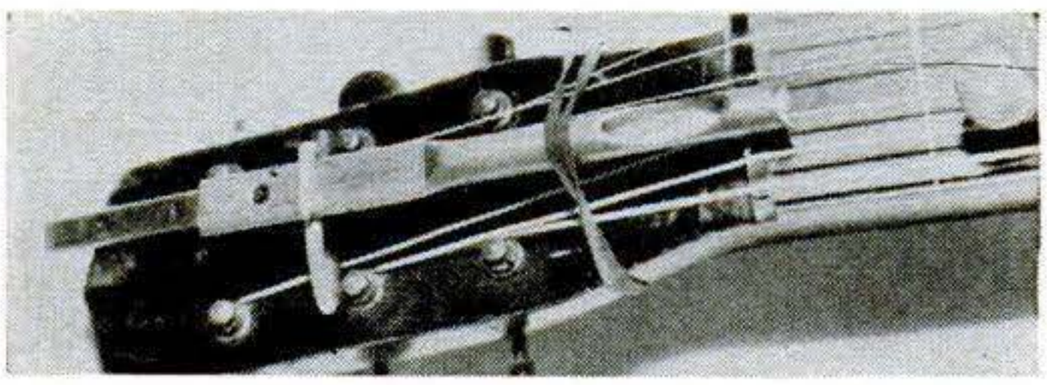


Shelf Racks Protect Screens

WIRE shelf racks taken from an old oven or ice box make excellent guards for the bottoms of screen doors that are apt to be kicked in by children or dogs.

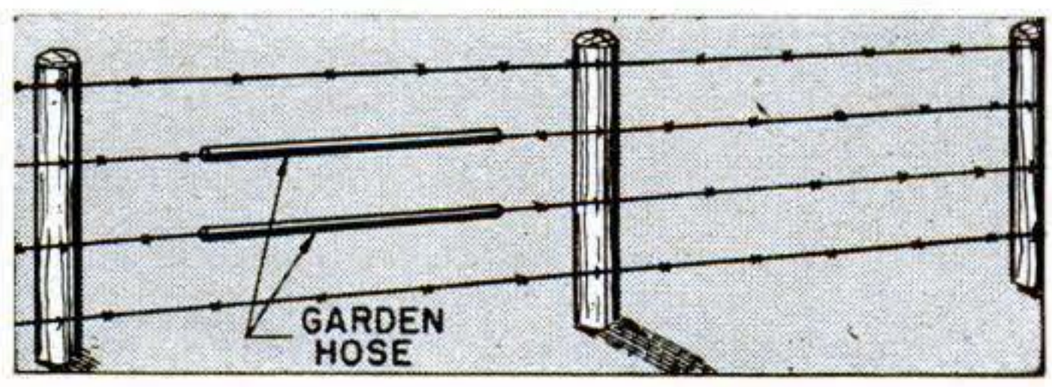
If the available rack is long enough, just staple it crosswise over the bottom of the screen. Most likely, however, you'll have to work with smaller racks. These can be used vertically by installing an extra batten in the door.—*Victor H. Lamoy, Upper Jay, N. Y.*

Steel Reed Tunes Instruments



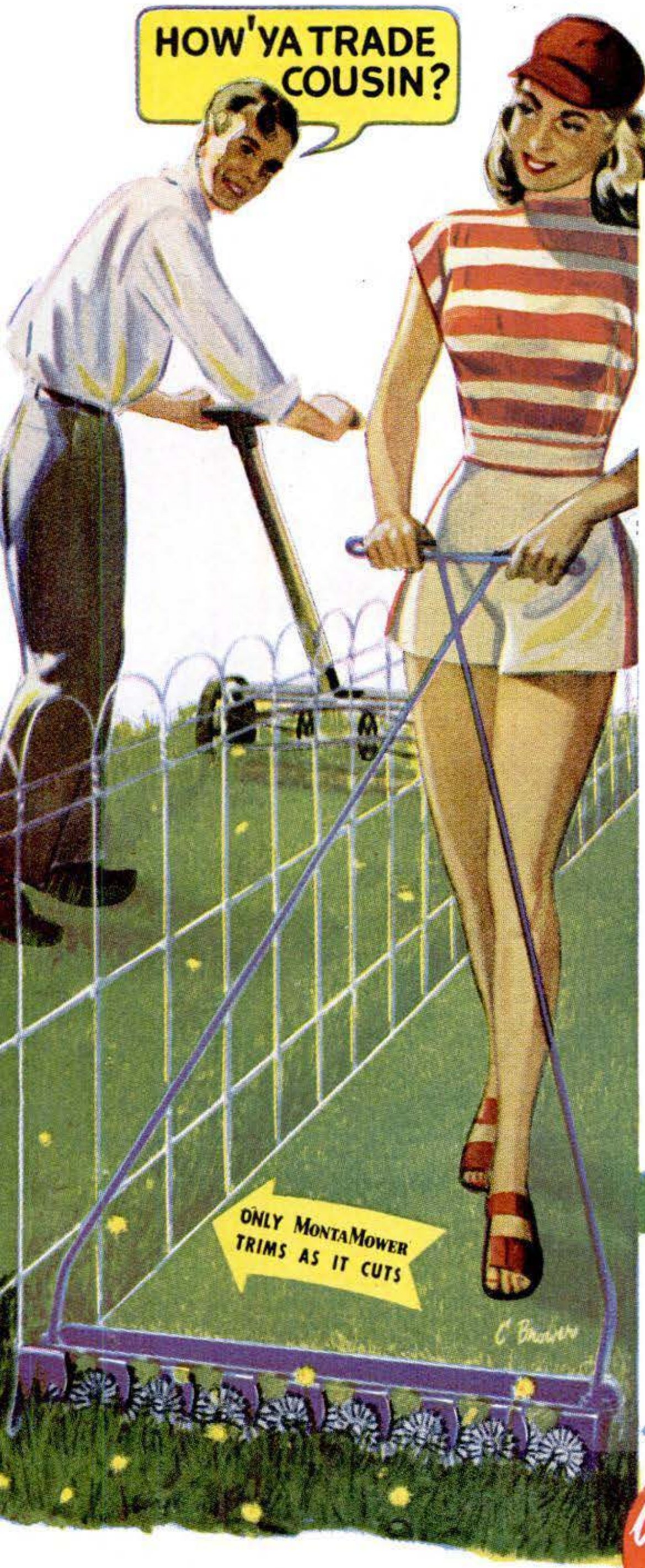
STRINGED instruments are tuned visually with a tuner made by Ardell Mfg. Co., Long Beach, Calif. It's placed as above, the string strummed, and peg turned. When a steel rod in the unit reaches its widest oscillation, the string is in tune.

Garden Hose Prevents Rips



THERE'S no need to install a regular gate in a barbed wire fence just for the sake of an occasional crossing. Instead, place two lengths of garden hose on parallel strands. You then can pass through without the threat of torn clothing.

Copyrighted material



MONTAMOWER
Mows and Trims LAWNS
IN ONE EASY OPERATION

I wouldn't trade my MontaMower for a dozen ordinary lawn mowers!"

The above statement is a direct quotation from one of thousands of unsolicited testimonial letters received from MontaMower owners every year.

And little wonder MontaMower owners are so enthusiastic! MontaMower represents the first basic advancement in lawn mowing devices during the past half century. It is a new and different kind of lawn mower that mows and trims in one easy operation.

Actually, the MontaMower is a live, 8¼ lb. precision machine that smoothly and quietly cuts a full 16" swath through grass, dandelions, spike grass and tall lawn weeds (including the ones that ordinarily pop back-up to cause you extra work).

AND WHAT'S MORE — MontaMower does what no conventional mower can do! It cuts right up to walls, fences, trees and posts — practically eliminates hand trimming. It cuts under foliage, around flower gardens and close-quarter borders which cannot be mowed successfully with conventional hand or power mowers.

The MontaMower is so light, so sturdy and responsive, that even women and children can operate it easily and efficiently. Owners tell us that with their new MontaMowers they cut their lawns in half the time — with less than half the effort.

Learn these facts about the MontaMower from actual experience . . . it's sold under a liberal "Written Guarantee" which permits you to try it on your own lawn . . . makes you the sole judge of its merits. Get the complete facts about the moderately priced MontaMower, AT ONCE! **Just fill out the coupon below and mail it today.**

SAVE TIME AND LABOR WITH A MONTAMOWER

Weight only 8¼ lbs.

SOLD DIRECT — ON APPROVAL

Here's HOW IT WORKS

The new, improved MontaMower has eight pairs of sharp-edged, precision made and fitted, tool-steel cutting disks, slightly overlapping and self-sharpening, working as a unit. Each pair revolving toward each other gathers the grass and cuts it cleanly at the intersection of the disks. The new improved model is easily and quickly adjustable to cutting height! It's as modern and efficient as an electric razor!

The MontaMower is sold only by direct mail to users (no agents or dealers . . . no foreign sales at present.)

TRY IT ON YOUR OWN LAWN!

MONTAMOWER DISTRIBUTING CO.
Sales and General Offices
65P KEELER BUILDING • GRAND RAPIDS 2, MICHIGAN

Gentlemen: Without obligation, kindly send me complete descriptive literature, price, guarantee information, and full details of Approval Offer.

NAME_____

ADDRESS_____

CITY_____ STATE_____

FACTORIES, TRAVERSE CITY, MICHIGAN

MAIL THIS COUPON TODAY!

Its distinctive styling goes far beyond just pleasing the eye. Here's design that flows naturally from advanced engineering . . . to fit form to function . . . to offer you a great New Plymouth that, inside and out, is better in every way!

Beauty with Reason

That sweeping, new low silhouette is something to see. And this is beauty with a reason. It helps give you a car that's easier to use in all ways. Easy to start—easy to drive—easy to park—easy to see out of.

Beauty for Comfort

The beautiful new interior styling is even better than it looks. The famous chair-height seats are now even wider. There's plenty of room for long legs and high hats. Windows lift and lower easier.

Beauty for Safety

The increased glass area is nice to look at from the outside. But it's there to **look out of** from the inside. Both windshield and rear window are larger. You get a clear, undistorted view of the road.

Just your style!

Special De Luxe 4-Door Sedan with Longer 118" Wheelbase

the great new Plymouth

For More Safety

New body construction makes the New Plymouth a sturdier, safer car. Frame and body are 23% more rigid. The New Plymouth has a lower center of gravity. It hugs the road better. And it handles with ease.

Beauty for Performance

There's a more powerful engine. This is the result of a newly designed cylinder head, increased compression ratio and a new intake manifold. New chrome compression ring gives even longer engine life.

Beauty for Value

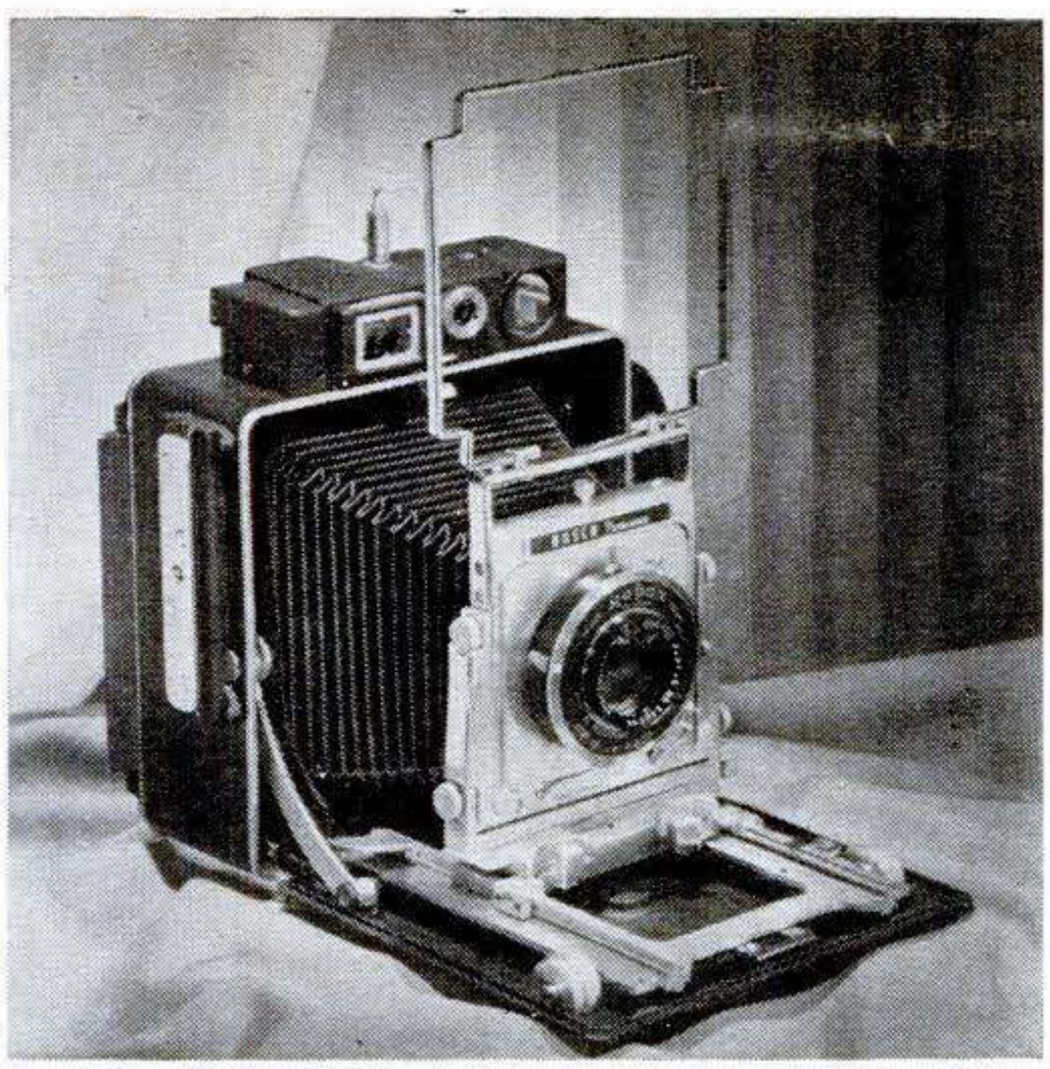
To see how new car beauty helps make a better new car—see your Plymouth dealer now! You'll find that the great New Plymouth—feature for feature, dollar for dollar — hits a new high in automobile value!

NOW there's more difference than ever in low-priced cars — and the great New Plymouth makes the difference. See this new car at your Plymouth dealer's now.

PLYMOUTH Division of CHRYSLER CORPORATION, Detroit 31, Michigan

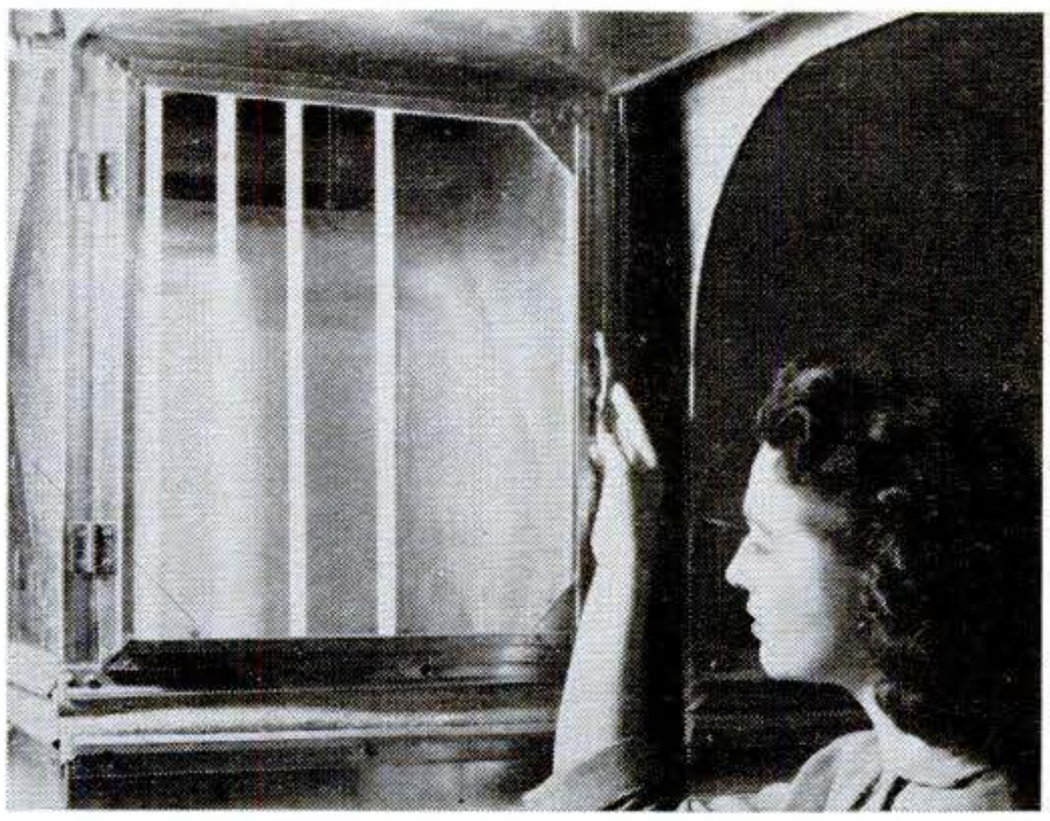
PLYMOUTH BUILDS GREAT CARS

Copyrighted material



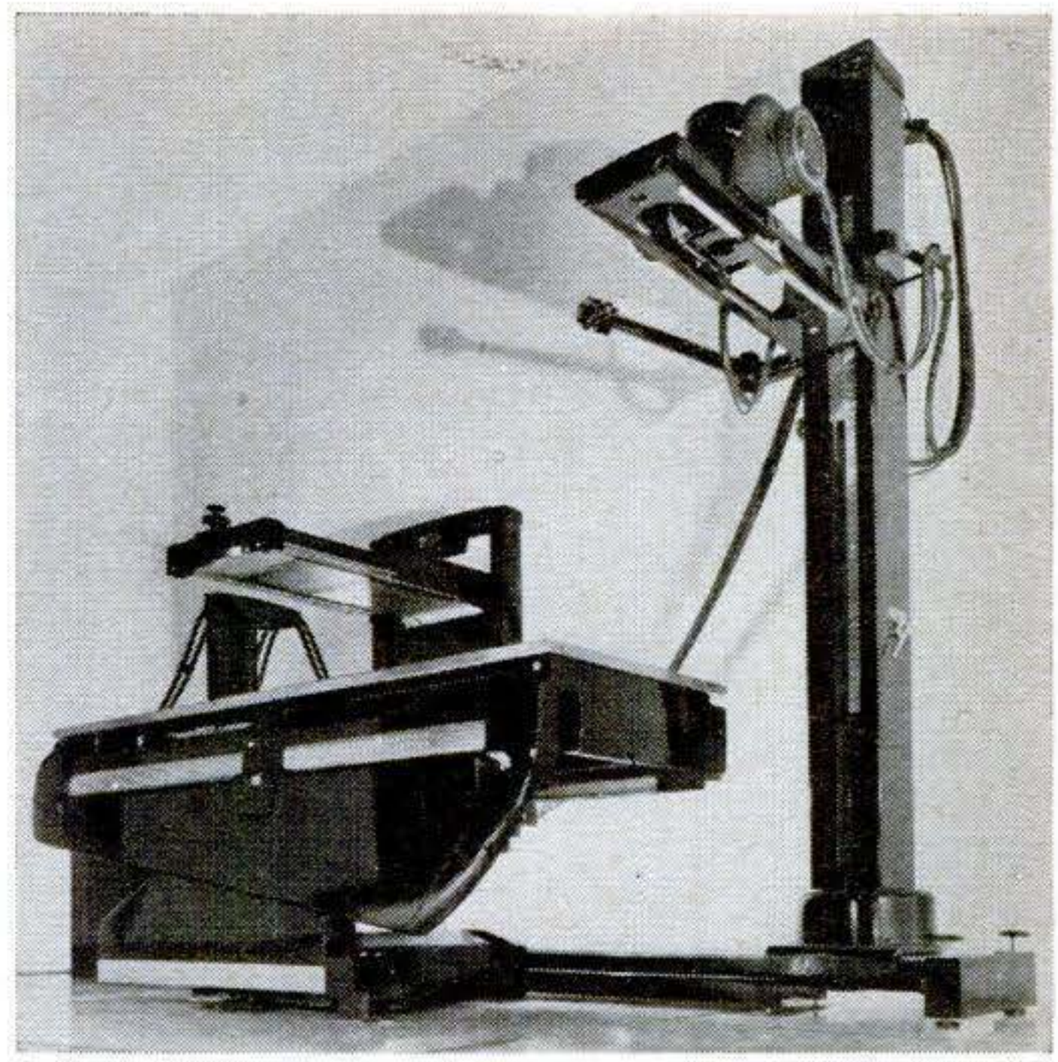
Camera Focuses Easily

A SINGLE viewer in this all-metal, 4 x 5 press camera lets you make all focusing adjustments without taking your eye from the one window. Called a Vue-Focus®, the new viewer combines optical view finder, range finder, night-focus light, and automatic parallax. The camera, made by Busch Precision Camera Corp., of Chicago, has a revolving back that locks automatically in 90-, 180-, 270-, and 360-degree positions.



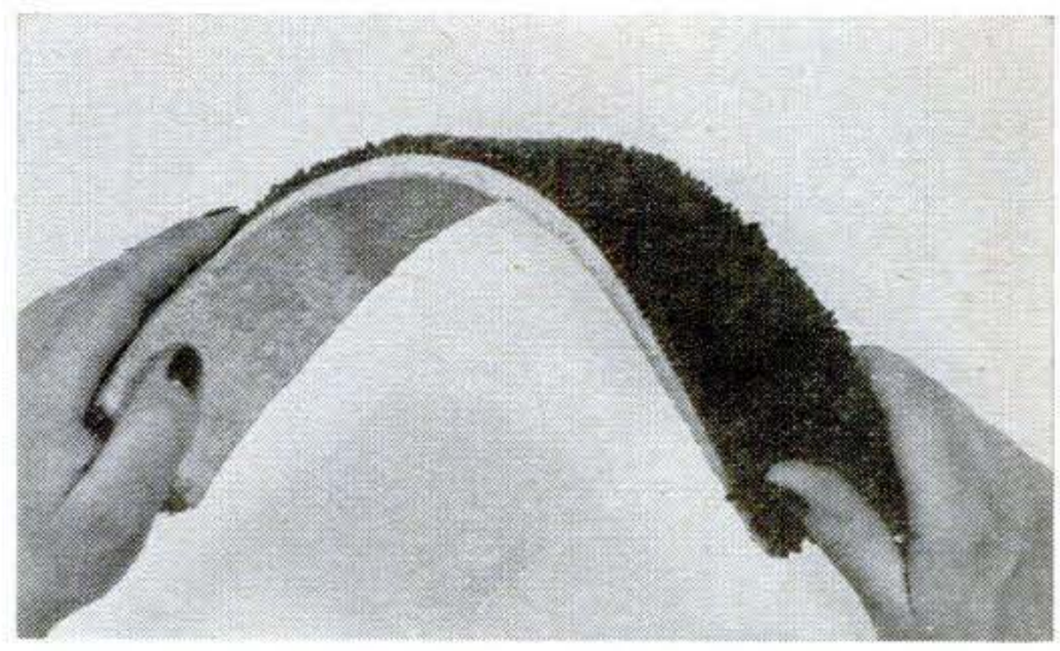
Lamps Purify Air

IF these tubular, germicidal lamps are used with your hot-air heating system, you can be sure the air you breathe is pure. Before recirculation through the ducts, air is exposed to the lamps' ultraviolet rays to kill any germs. Made by Westinghouse, the tubes are said to be as powerful after a year's burning as when new. Shown installed in a basement, the lamps shut off automatically when the glass door is opened.



X Rays See Deeper

To give doctors clearer pictures of your insides, GE has stepped up the power of this new diagnostic X-ray apparatus from the conventional 100,000 volts to 130,000. Yet added safety devices, including an automatic exposure timer, give both the patient and operator increased protection against excessive radiation. The new equipment called the Maxiscope 500®, can be used for either fluoroscopy or X-ray photography. A pedal-controlled, variable-speed motor tilts the table to the desired angle.



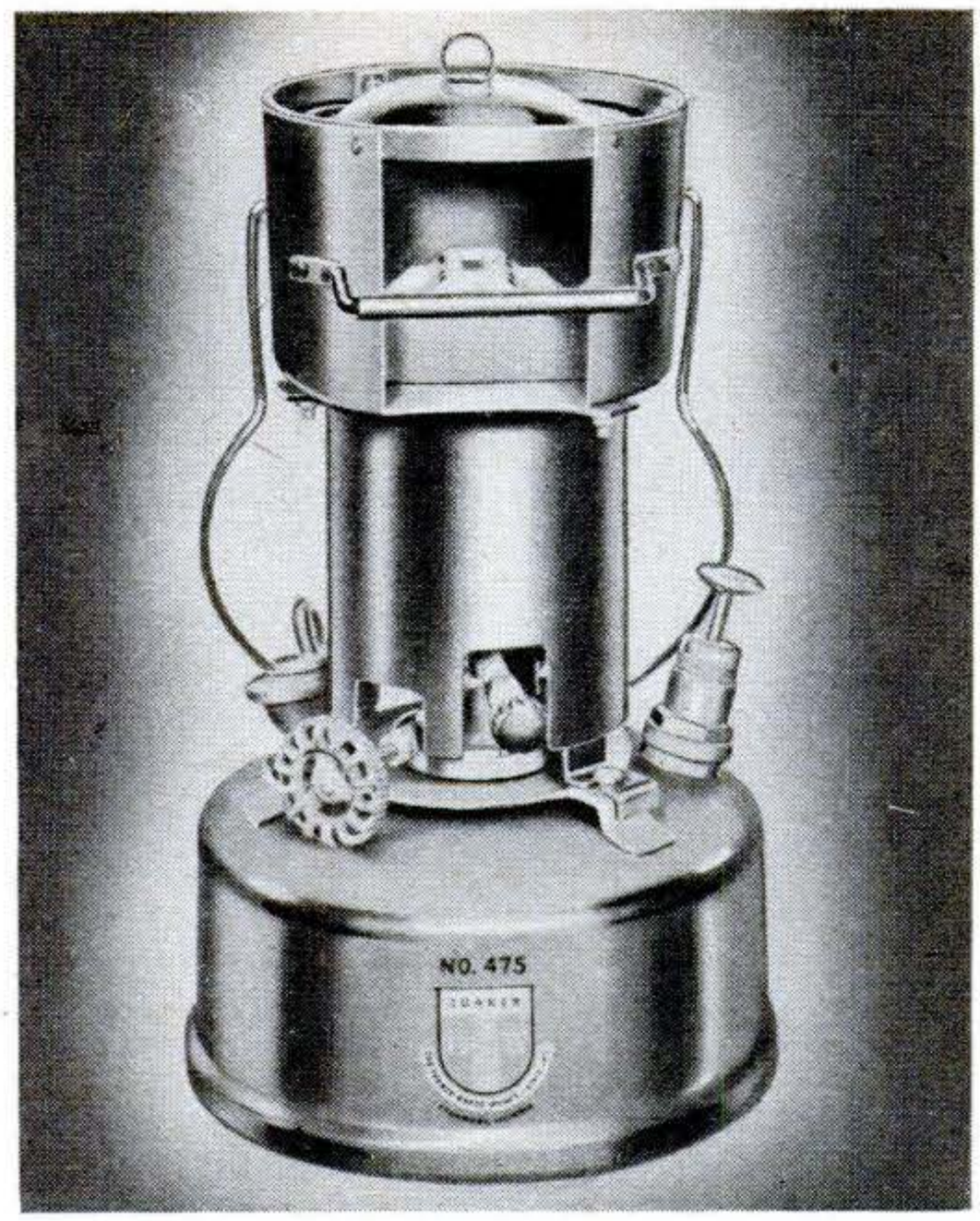
Rubber Resists Fire

A NEW, low-cost sponge rubber that won't burn can be applied and vulcanized directly to rugs, upholstery, and shipping cartons. Called Spon®, the compound can be shot from a hose, cast in open molds, or run off in sheets. The photo above shows how it is used to back a carpet strip. Developed by the Commonwealth Engineering Co., of Dayton, the material is also used for insulation and soundproofing.

Copyrighted material

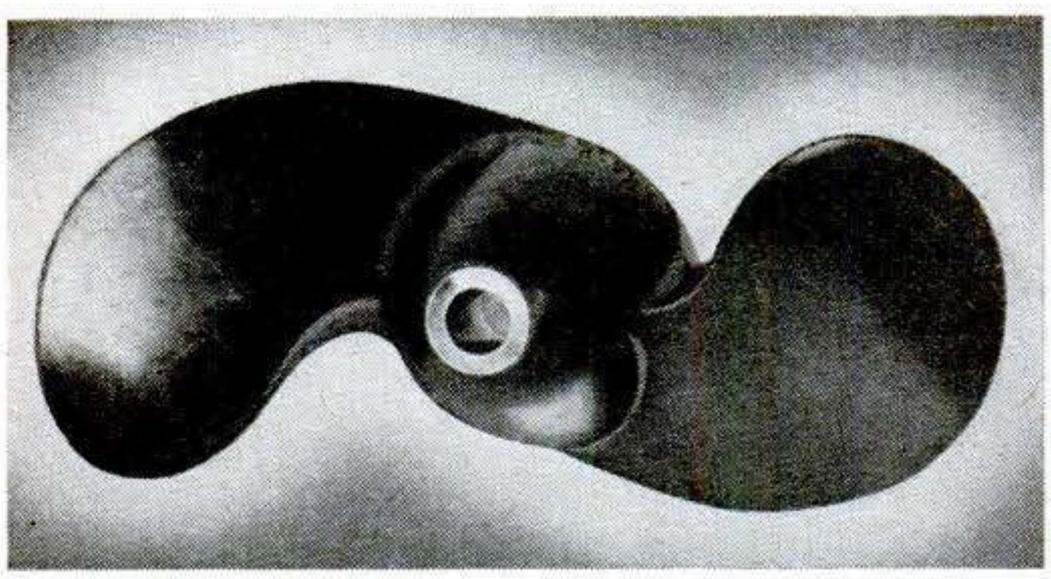
Two-Way Portable for Hams

THOSE tiny, two-way portable radios widely used in front-line communications during the war are now being made for amateur and public-safety use. This 3½-pound, battery-powered Sperti model operates on two bands, 144 and 148 mc., and has an average range of three miles over flat or slightly rolling country. Only 10 inches high, it has a folding dipole antenna or can be connected to a fixed antenna for greater range.



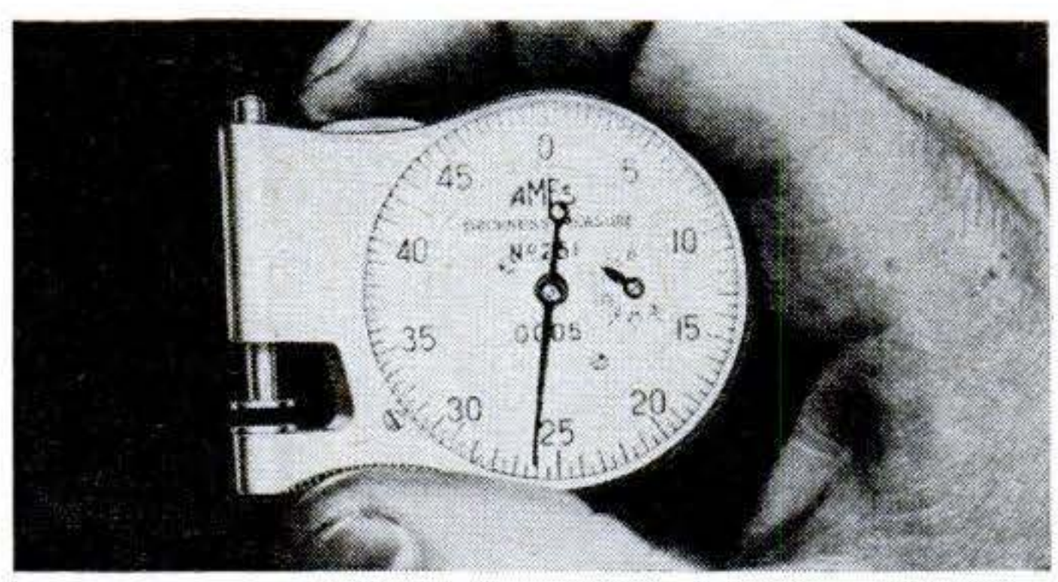
New Fire Pot for Tin Workers

TINNERS need not interrupt their work to refill this new gasoline-burning Turner fire pot—it will burn for nine hours on one filling of its gallon tank. A special "carburetor" control permits regulation of the fuel supply for the best combustion at different heat requirements. The flame control, which adjusts the heat to the desired amount, also cleans the burner orifice automatically, eliminating manual cleaning.



Rubber Boat Prop Is Tough

DRIFTWOOD and underwater obstructions, the bugaboo of boat propellers, are no problem for this Goodyear rubber outboard propeller. Made around a metal core, it is stiff enough to drive a boat yet so resilient it bounces harmlessly off objects that would damage an ordinary metal propeller or shear the drive-shaft pin. It is also said to slide easily over weeds without fouling. The one above is for a 2½-hp. outboard motor.



Thickness Gauge Fits Pocket

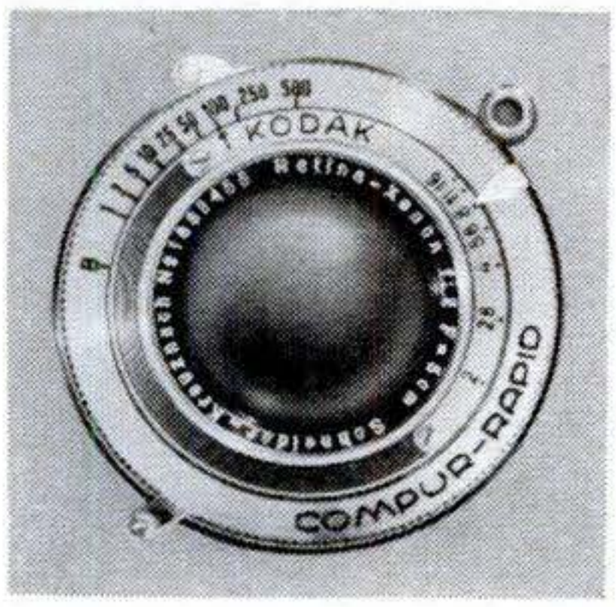
WANT to know the thickness of a piece of paper, sheet of metal, pane of glass? This watch-size gauge will tell you at a glance. Made by the B. C. Ames Co., it will measure any material up to 5/16 of an inch thick. The material is inserted between the two contact points at left, and the large hand indicates the thickness in .0005-inch graduations. The small hand counts revolutions of the large hand, each equal to .05 inch.

Copyrighted material

Famous 35mm. Miniature

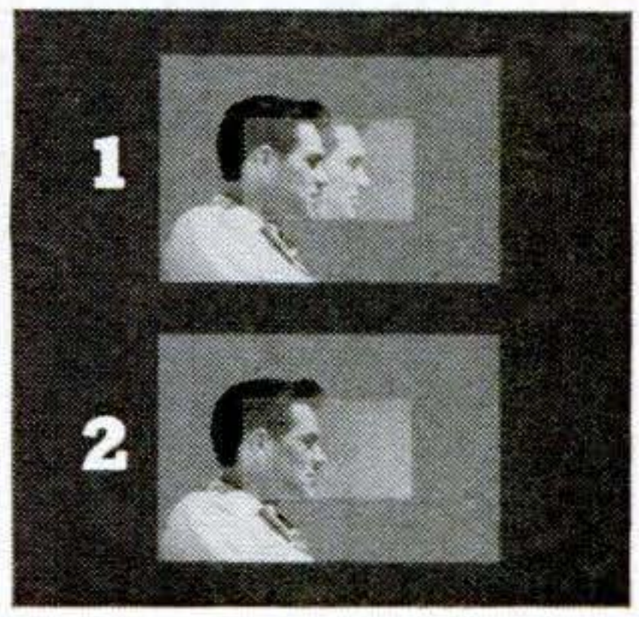
...now finer than ever

Ultra-fast f/2 coated lens. Ask your Kodak dealer for a demonstration of this famous Kodak miniature. $197.75, including Federal Tax.

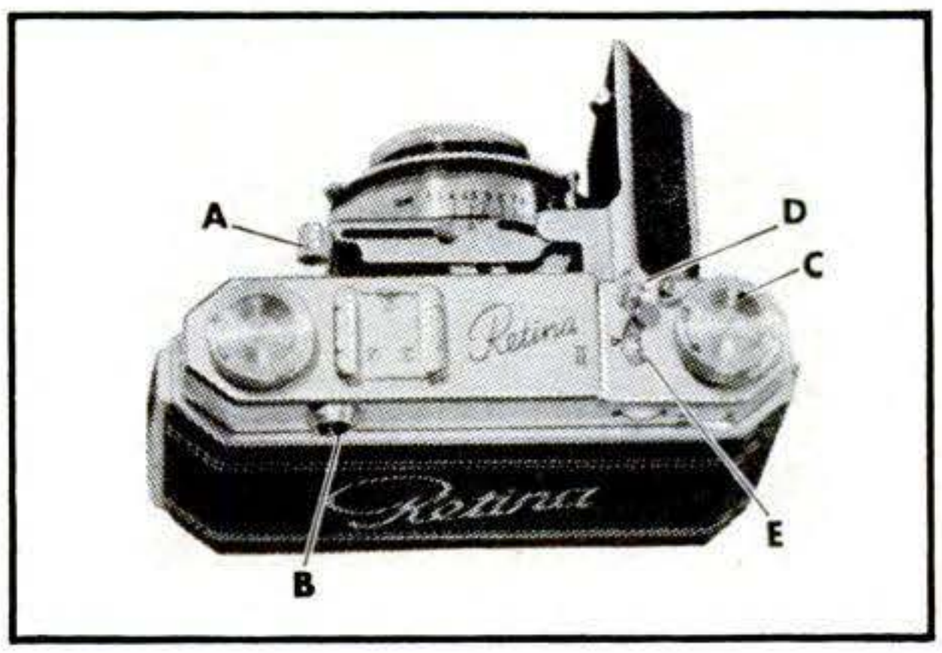


All ready for action with ultra-fast Schneider Xenon *f*/2 Lens and Compur-Rapid 1/500 Shutter—nine speeds plus *bulb*. Uses black-and-white Kodak 135 Films and Kodachrome Film.

New all-in-one view and range finder. Figure **1** shows subject *out of focus* with two images in the center area. Figure **2** shows subject *in focus* with one image superimposed on other.



Finger-tip operation means easy control of the camera and a better picture on every shot. **A,** focusing knob; **B,** single view-and-range-finder window; **C,** film-wind knob (with automatic film stop and double-exposure prevention); **D,** shutter release; **E,** automatic exposure counter.



Extreme Compactness—folds up to fit small pocket or handbag. Built for long life—with strong but light die-cast aluminum alloy body and pin-grain leather covering. Its handsome design and watchlike workmanship are unique features. You'll like its solid feel and balance.

Also ask your dealer to show you the Kodak Retina I Camera with *f*/3.5 lens, a wonderful buy at $72.75, including Federal Tax. Trim and sleek in styling. One look will convince you of its value.

(Prices subject to change without notice) *"Kodak" is a trade-mark*

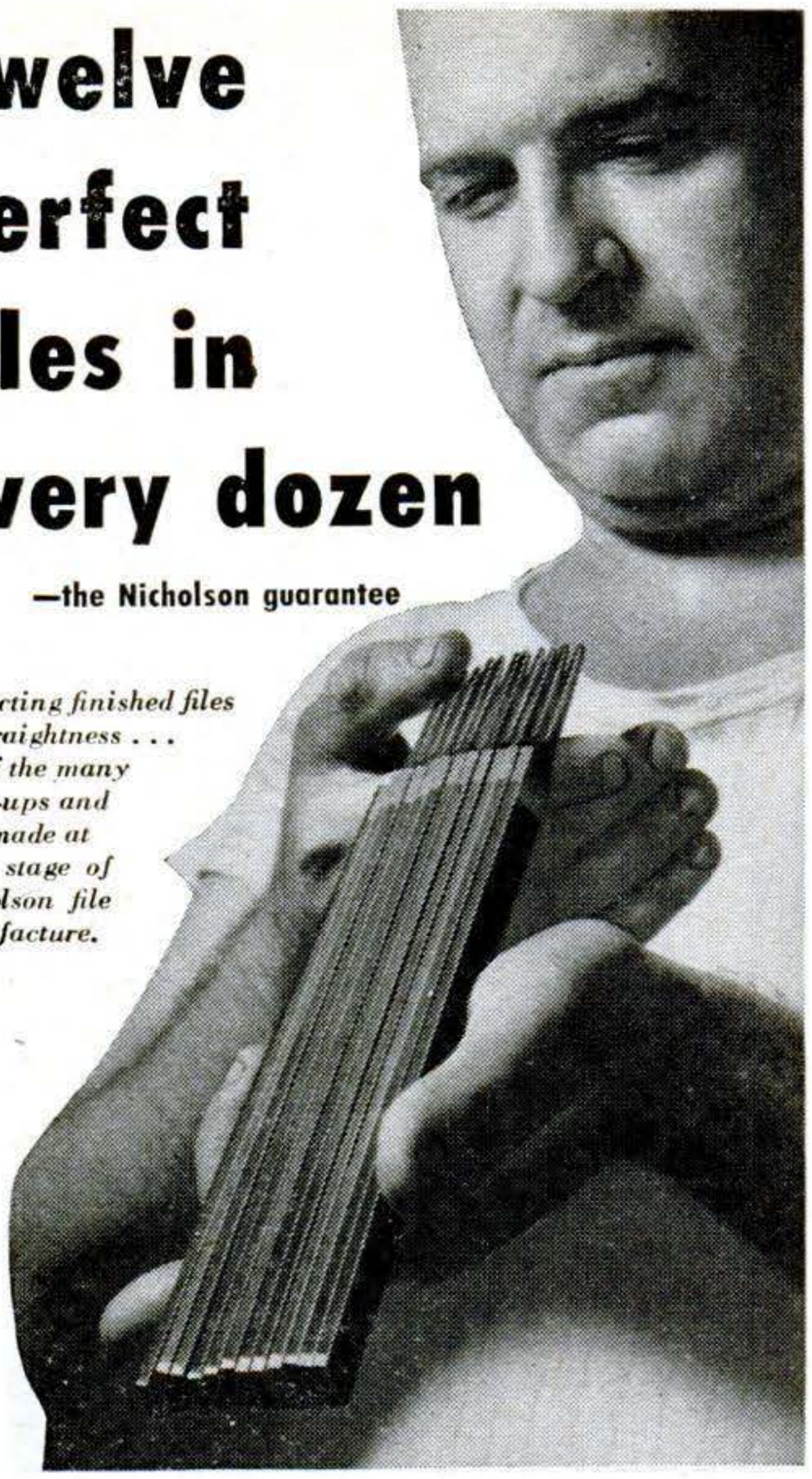
Kodak

EASTMAN KODAK COMPANY, Rochester 4, N. Y.

Copyrighted material

Twelve perfect files in every dozen

—the Nicholson guarantee



Inspecting finished files for straightness . . . one of the many check-ups and tests made at every stage of Nicholson file manufacture.

WE *have* to make good files or we could not make good on that guarantee. A "perfect" file is one which in practical use does the best job that is possible through being precisely straight, carefully balanced, uniformly hardened, accurately cut (with teeth even in height and sharpness), and made of the finest file steel obtainable.

Nicholson has had 85 years of experience in manufacturing files *exclusively*. Every Nicholson or Black Diamond file is designed, made and tested to give you the best file performance, the longest file life, and therefore the most file value. There's more satisfaction in making files that way, because we know there's more satisfaction in using them. As a craftsman you'll agree that makes a lot of sense. At good hardware stores throughout the continent.

• **FREE BOOK, *"FILE FILOSOPHY"*** — tells about file kinds, use and care . . . 48 interesting illustrated pages. Post-card request brings you your free copy.

NICHOLSON FILE COMPANY
19 Acorn St., Providence 1, R.I.
(In Canada, Port Hope, Ont.)

NICHOLSON FILES *FOR EVERY PURPOSE*

DO EVERY JOB *better-faster-cheaper-* WITH COMPRESSED AIR

Paint Buildings, boats, tractors, trucks; refinish furniture and fenders; inflate tires; grease and lubricate motors, engines, implements. Destroy weeds. Rid livestock, poultry and pens of pests with portable air power.

Free Literature explains relative advantages of 4-cylinder **PRESSURE QUEEN** and single-cylinder **PRESSURE PRINCESS** spray painting outfits. Tells how to save material, time and money by using the proper outfit at the right price.

It Is Yours For The Asking
Write Today

THE CAMPBELL-HAUSFELD CO.
151 RAILROAD AVE. HARRISON, O.

ACCURATE and TOUGH is the MASTER TUFBOY!

BUY ONE NOW!

Mechanics and craftsmen will welcome the Master Tufboy's accuracy and rugged construction. Its blade, of the finest tempered spring steel, has clearly etched graduations and its case is made of the toughest chrome-plated zinc alloy which will withstand the roughest kind of treatment. You will find the Master Tufboy at your local hardware or building supply dealer or if you prefer, use the coupon below.

MASTER
REG. U.S. PAT. OFF.
WOOD AND STEEL TAPE RULES

Master Rule Mfg. Co., Inc.
201 Main Street, White Plains, N. Y. PS-5
Gentlemen:
I enclose ☐ $1.35 for the 6 ft. Tufboy
I enclose ☐ $1.65 for the 8 ft. Tufboy
Name.....
Address.....
City.....State.....

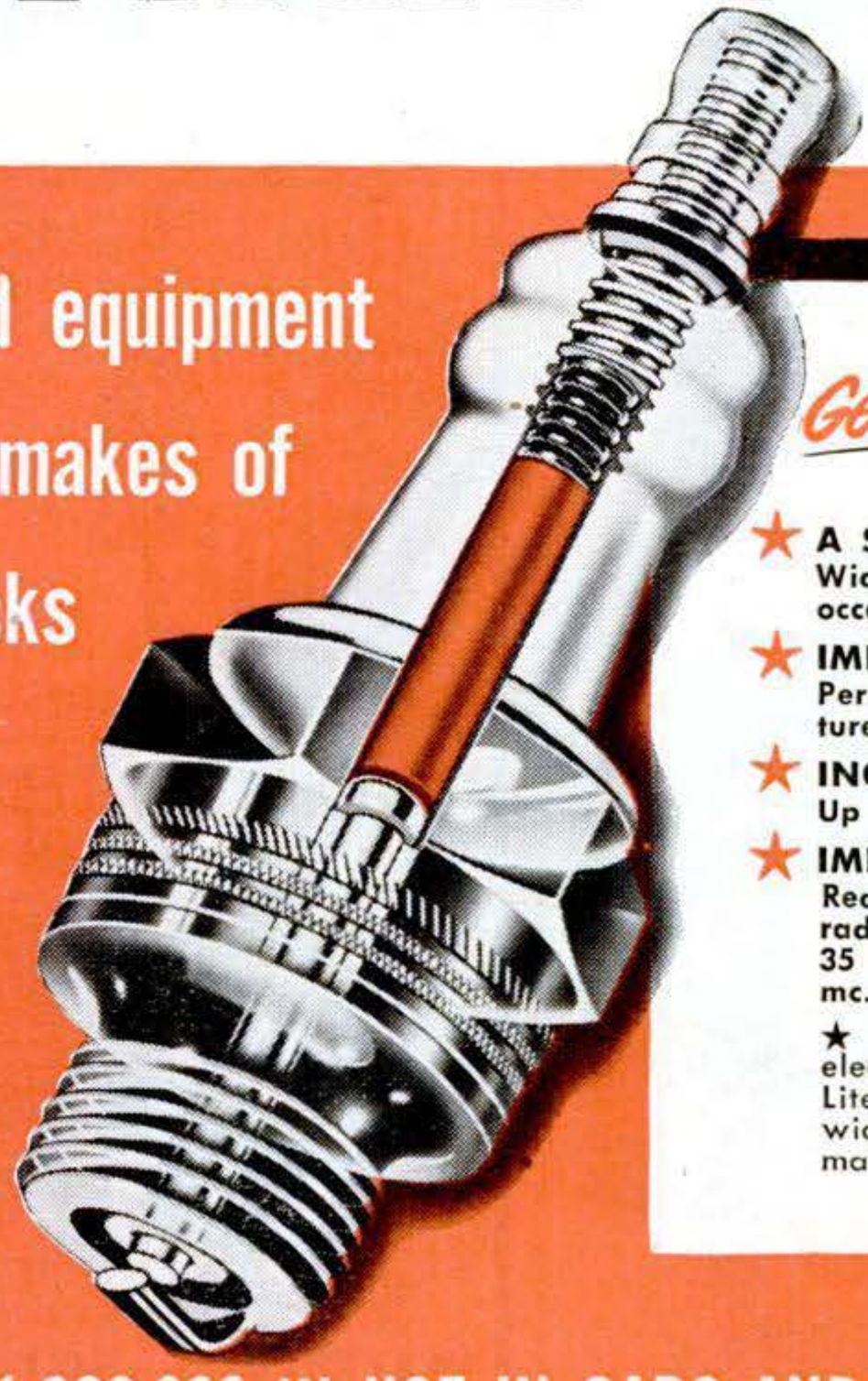
Copyrighted material

Only AUTO-LITE

OFFERS CAR AND TRUCK OWNERS EVERYWHERE THE SENSATIONAL ADVANTAGES OF A

Resistor Type SPARK PLUG

Now standard equipment on 6 leading makes of cars and trucks



Get these 4 Star Benefits

★ **A SMOOTHER ENGINE IDLE**
Wider spark gap helps eliminate occasional missing.

★ **IMPROVED GAS ECONOMY**
Permits burning of leaner mixtures and reduces misfiring.

★ **INCREASED ELECTRODE LIFE**
Up to 200% and more.

★ **IMPROVED RADIO RECEPTION**
Reduces plug interference with radio, radar and television within 35 mv/m from 540 kc. to 150 mc. at 50 ft.

★ Because of its low rate of electrode erosion, the new Auto-Lite Resistor Spark Plug permits wider initial gap settings and makes these advantages possible.

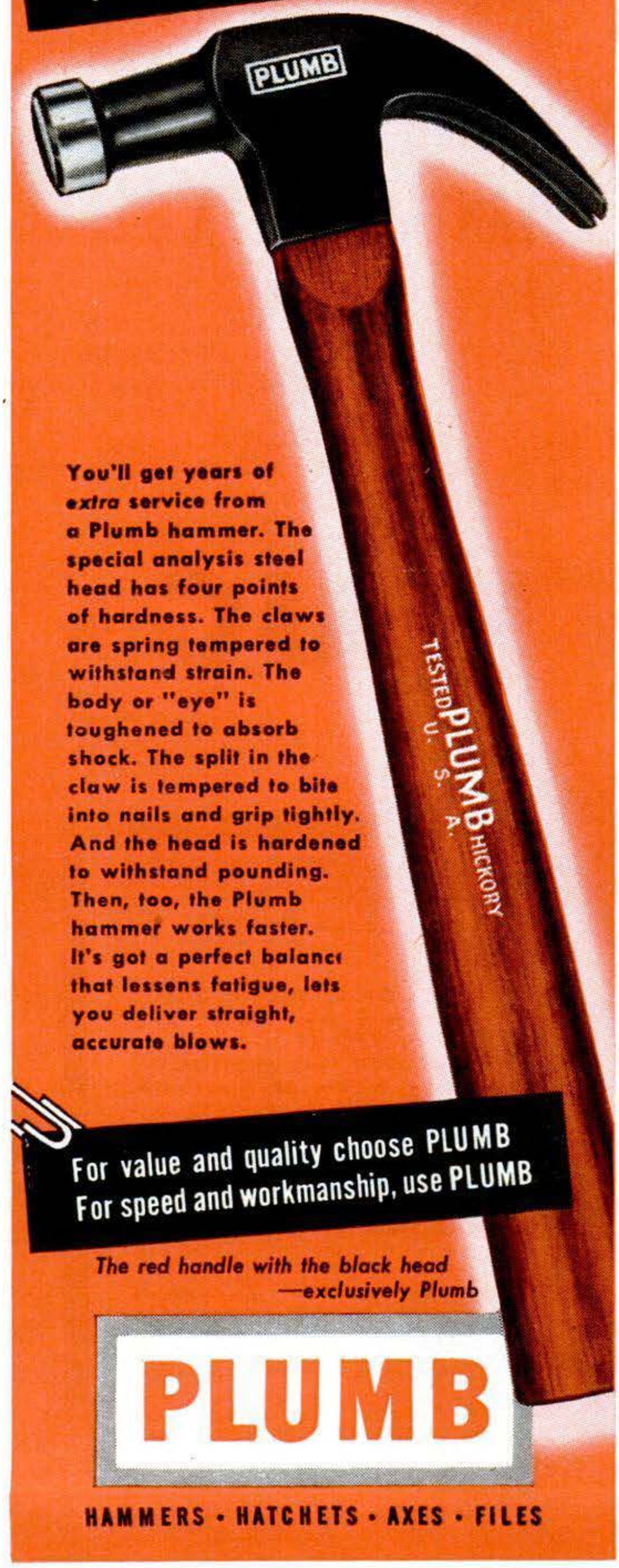
AUTO-LITE MEANS PRECISION MANUFACTURING

ALREADY OVER 11,000,000 IN USE IN CARS AND TRUCKS EVERYWHERE!

Copyrighted material

PLUMB TOOLS

ARE MADE TO LAST AND DO JOBS FAST



You'll get years of *extra* service from a Plumb hammer. The special analysis steel head has four points of hardness. The claws are spring tempered to withstand strain. The body or "eye" is toughened to absorb shock. The split in the claw is tempered to bite into nails and grip tightly. And the head is hardened to withstand pounding. Then, too, the Plumb hammer works faster. It's got a perfect balance that lessens fatigue, lets you deliver straight, accurate blows.

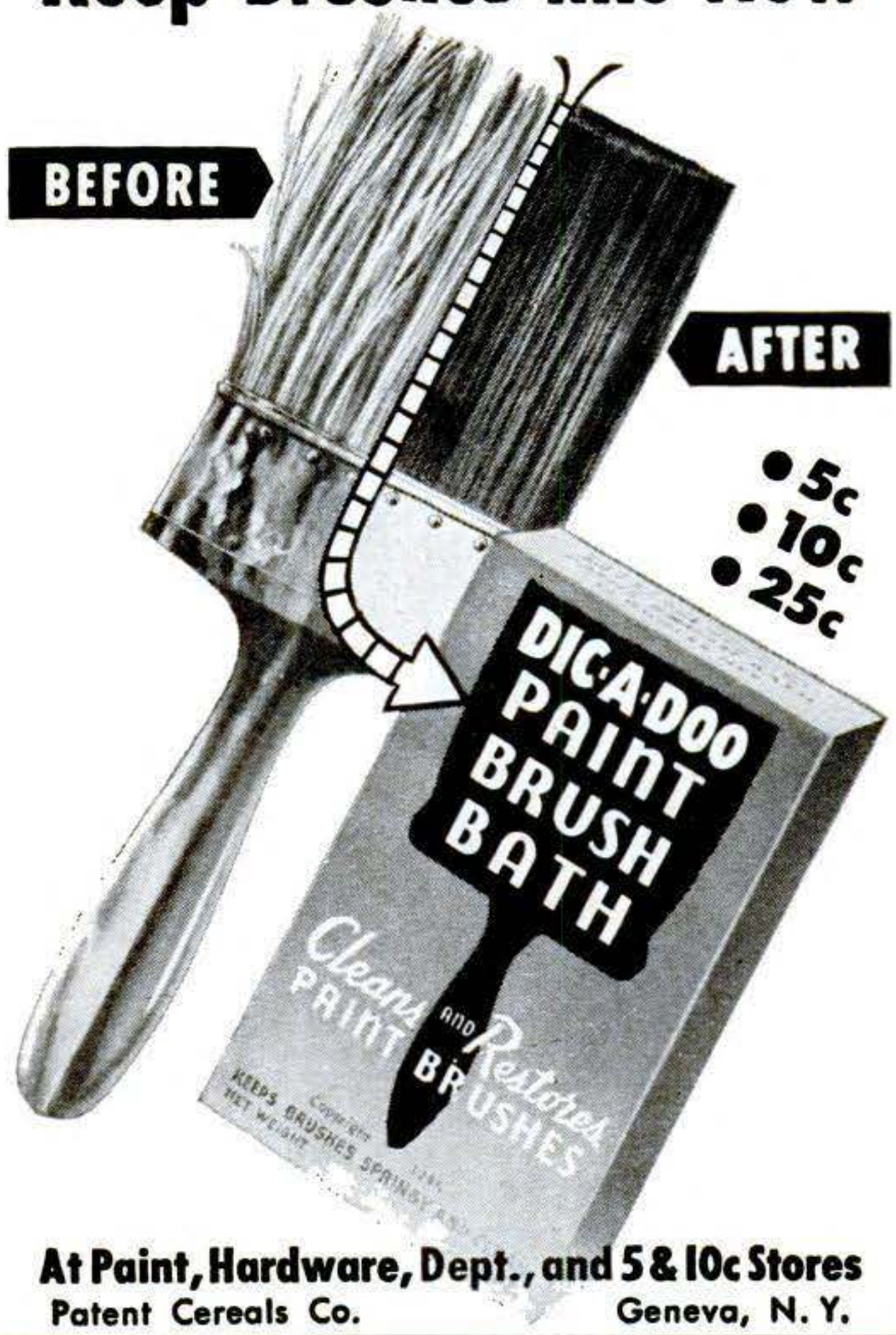
For value and quality choose PLUMB
For speed and workmanship, use PLUMB

The red handle with the black head —exclusively Plumb

PLUMB

HAMMERS • HATCHETS • AXES • FILES

Keep Brushes like New



At Paint, Hardware, Dept., and 5 & 10c Stores

Patent Cereals Co. Geneva, N. Y.

REMOTE POWER CONTROLS

WORK AT ANY DISTANCE—TO TURN

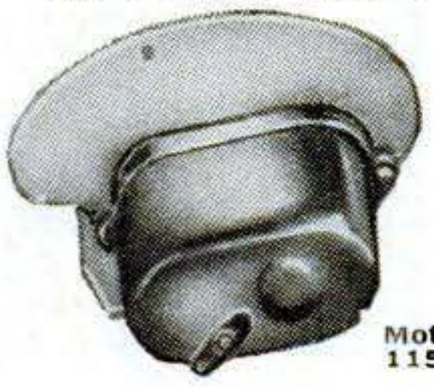
- ★ Dampers, Vents, Valves
- ★ Television & FM Antennas
- ★ Camera Controls
- ★ Radio Dials
- ★ Motor Speed Controls
- ★ Precision Remote Indicators

When shaft of one unit is turned, other will follow precisely to the same position. Develops 2½ lb. in. of torque. Simple electrical connections. 4½" dia. x 5½" long. Solid bronze corrosion proof housing. Operates on 115 V 60 cy AC. Complete instructions.

Stock No. SEL-69 (Allow postage for 26 lbs. per pair) **$9.95 Pair**

OSCILLATING ELECTRIC WINDSHIELD WIPER MOTOR

Car-Owners—Hobbyists—Camera-Fans—Displayers



PLAY SAFE! Add a rear windshield wiper to your car. Great for hobbyists or moving displays. Makes fine agitator for photographic use. Operates 5-10 volts AC or DC, 30 to 200 (135 degree arc) strokes per minute depending on voltage. Extremely powerful. Easily installed. Draws 2 amp. at 6 volts. 3" x 3" x 2".

Stock No. AMO-92
Reg. Price $5.95—Now . . . $1.95 Each

Motor complete with transformer for 115 v 60 cy operation (Stock No. AM064) $2.95

Mail Orders add 25c each for postage and handling

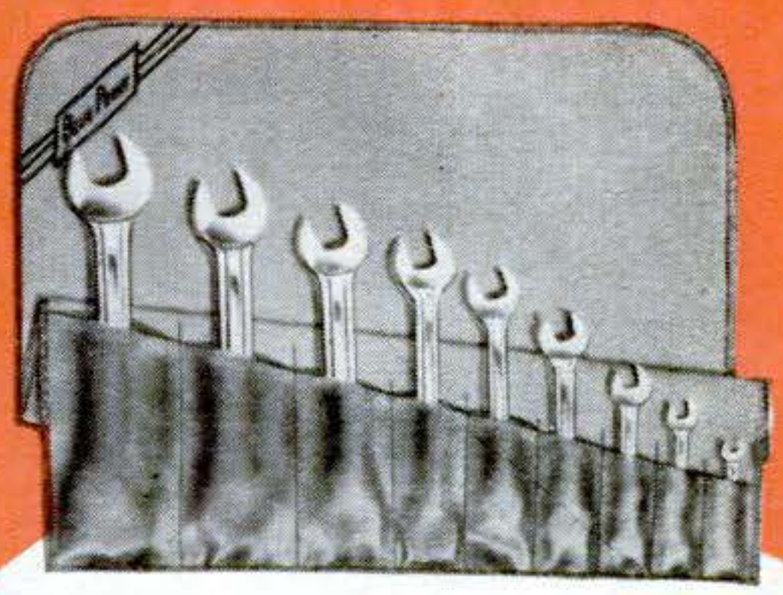
DUBIN ELECTRONICS CO., INC.
103-02 Northern Blvd., Corona, N. Y., PS-59

Copyrighted material

Snap-on's

Blue-Point Supreme Open End Wrenches are unequaled for strength, toughness and fatigue-resistance

Here are the eight superior qualities that make them the finest tools money can buy: 1. Thinner heads. 2. Narrower jaws. 3. Precision machined openings. 4. Greater strength. 5. Lighter weight. 6. Balanced design. 7. Sure-grip handle. 8. Finest alloy high carbon steel, heat treated from skin to core.

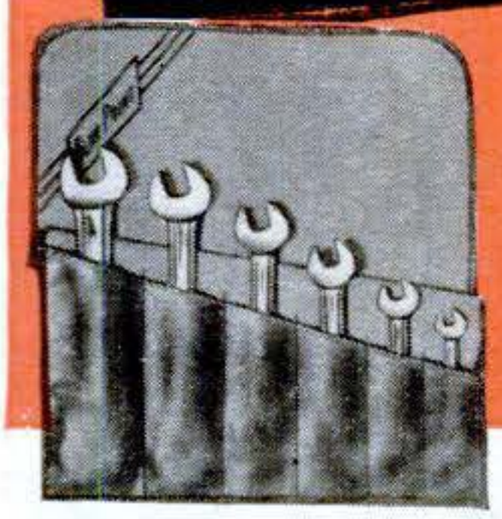


Blue-Point Supreme 9-Pc. Wrench Set

$16.15 In Kit Bag

TOOLS ONLY $14.50

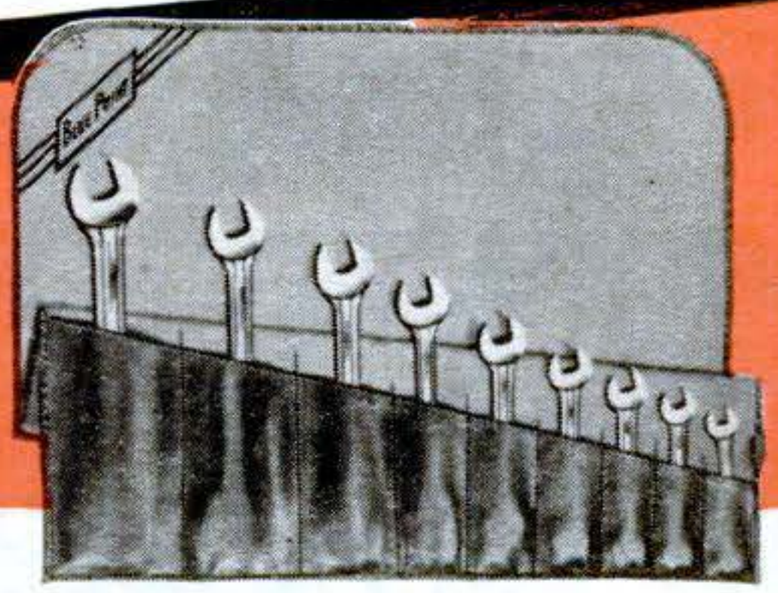
Here is one of Snap-on's most popular Open End Wrench Kits. There are 18 different wrench sizes that range from 1/4" to 1 1/4". They solve many of your nut-turning problems.



6-PC. WRENCH SET

12 popular wrench sizes on six handles. Sizes from 3/8" to 15/16". No duplication of sizes. In leatherette kit bag . . $8.50

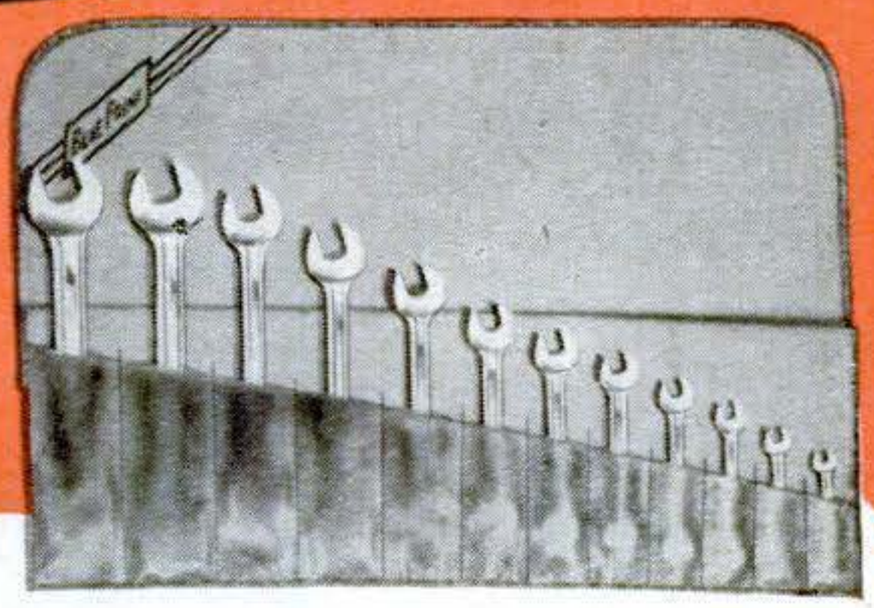
Tools only . . . $7.70



STURDY 9-PC. WRENCH SET

13 wrench sizes with 5 most popular sizes duplicated on different handles. Sizes from 3/8" to 1". In leatherette kit bag, only . . $12.75

Tools only $11.10



POPULAR 12-PC. WRENCH SET

Full range of sizes from 1/4" to 1 1/8" with 7 most used wrench sizes duplicated on different handles. Complete in leatherette kit bag, only $17.00

Tools only $15.35

MAIL THIS COUPON — TODAY!

SNAP-ON TOOLS CORP.
8060-E 28th Avenue • Kenosha, Wisconsin

Snap-on tools are sold only through authorized Snap-on representatives and not available at hardware stores, etc. Use this coupon to order—we deliver from nearest branch.

Snap-on Tools
THE CHOICE OF BETTER MECHANICS

Enclosed find ☐ Check ☐ Money Order or ☐ Company Purchase Order for the Open End Wrench Kit checked below.

☐ $17.00 ☐ $16.15 ☐ $12.75 ☐ $8.50
☐ $15.35 ☐ $14.50 ☐ $11.10 ☐ $7.70

NAME.....

ADDRESS.....

CITY..... STATE.....

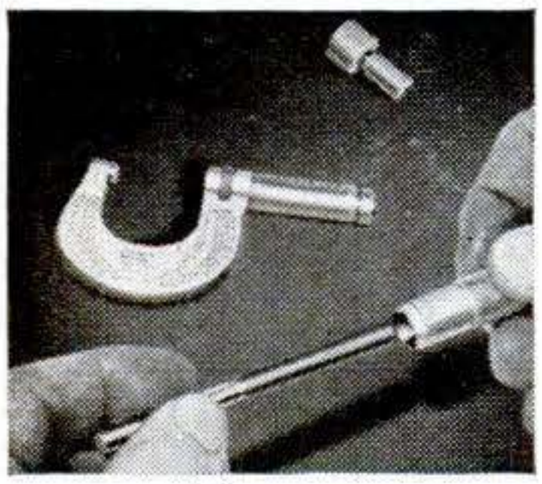
Copyrighted material

MECHANICS — See this Improved "Mike" Now at your dealers

7 SUPERIOR FEATURES: "Chrome Clad," Non-Glare Satin Finish, Easy to Read, Rust and Wear Resistant • One Piece Spindle • Hardened Ground Thread • Easy Adjustment • Cutaway Frame • "Rapid Reading" (Each Thousandth Numbered) • Micro-Lapped Mirror-Like Finish on Anvil and Spindle Ends.

The large throat depth and cutaway frame make entry possible in minimum clearance and enable easy measuring to maximum depth in narrow slots.

It is well balanced. Ratchet stop eliminates overpressure, gives consistently accurate measurements—important when your "feel" is off.



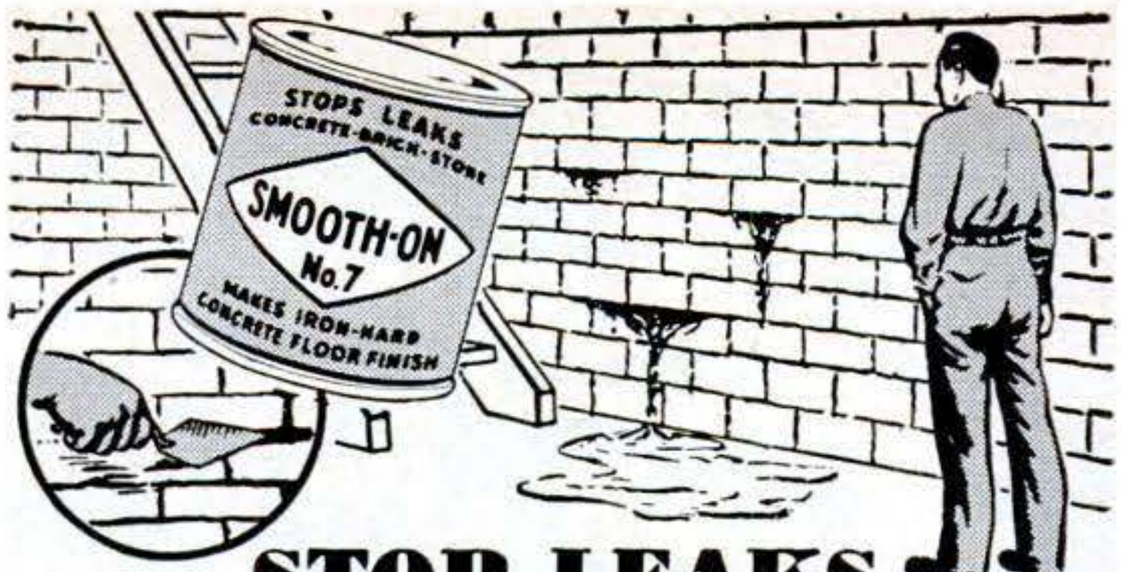
Easy to take apart and clean inside thimble and thread. Reading line keeps original position after adjusting for wear or lapping of anvil, and spindle faces.

FREE! Send for this booklet—
"The Amazing Story of Measurement"
Write Dept. S

Buy **LUFKIN**

Precision Tools • Tapes • Rules • FROM YOUR DEALER

The Lufkin Rule Company • Saginaw, Michigan



STOP LEAKS IN CELLAR WALLS

Do it with Smooth-On No. 7 Cement! Apply with trowel or stiff brush to leaky cracks, holes, porous spots, seams or other leaks in concrete, brick or stone walls and floors. The leaking will stop and Smooth-On will "stay put", for it expands slightly as it hardens. May be applied to wet or dry surfaces, indoors or outside. Use Smooth-On No. 7, too, to seal openings around pipes passing through walls. Buy Smooth-On No. 7 by name and number in 1-, 5-, 20- or 100-lb. size. If your hardware store hasn't it, write us.

FREE Leaflet and Handbook

We'll send you leaflet showing No. 7 uses, also the famous 40-page Smooth-On Repair Handbook describing other Smooth-On Cements and showing many helpful home repairs. 170 illustrations. Write today.

SMOOTH-ON MFG. CO., Dept. 58-E
570 Communipaw Ave., Jersey City 4, N. J.

Do it with

SMOOTH-ON

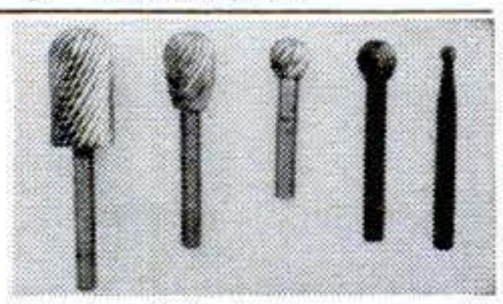
NO. 7 CEMENT

BARGAIN!

HIGH SPEED ROTARY FILES

Set of 5	Assorted	$ 2.00
" " 10	"	3.75
" " 20	"	7.25
" " 30	"	10.00

1/4" shank



WE BUY SURPLUS TOOLS

SID TOOL CO., 183 Grand St., N. Y., N. Y.

Stucco Spraying Earns High Incomes

It's today's biggest business opportunity in the building field. High returns from a low investment. Easy, fascinating work. Large waiting market because Colorcrete is applied over all kinds of old and new masonry surfaces — exterior and interior.

Beautifies and Protects All Types of Buildings

Pneumatic pressure sprays plastic-like Colorcrete to give enduring beauty and water-resistant values. Range of 30 gleaming colors; many textures. Easy to wash. Smartly modern. Write or wire today for Opportunity Portfolio.

COLORCRETE

COLORCRETE INDUSTRIES, INC.
572 OTTAWA AVE., HOLLAND, MICH.

Copyrighted material

Every day is fun day

ON A

HARLEY-DAVIDSON

with the new HYDRA-GLIDE FORK

EVER ride on a cloud? Ever wish you had a motorcycle that would give you that feeling? Well, brother, here it is . . . the 1949 Harley-Davidson with the Hydra-Glide Fork! Glide is a *mild* word for it! Never before has such riding comfort, steering ease and roadability been built into a motorcycle. You *float* over bumps, *skim* over rough roads, *sail* down the straightaways, enjoy every mile as never before. Even on longest trips, you're fresh as a daisy, ever ready for fun as you take in exciting race meets, endurance runs, hillclimbs, gypsy tours, sightseeing trips. Try a glide-ride and be convinced! See your Harley-Davidson dealer today. Mail coupon now.

HARLEY-DAVIDSON MOTOR COMPANY
Dept. PS, Milwaukee 1, Wisconsin

Send free copy of ENTHUSIAST magazine, filled with motorcycle action pictures and stories; also literature on latest models.

Name_____

Street or R.F.D._____

City_____Zone___State_____

Copyrighted material

Which of these 3 POWER TOOL KITS Do You Want?

A PORTER-CABLE Guild TOOL

Now!

- **A high-power, professional machine!**
- **And ALL these *selected* accessories!**

Choice of three kits, each with just the right equipment you need for your particular jobs. These kits assure the best work and the most work from the rugged GUILD Sander-Polisher.

This many-purpose Guild Tool has an extra-sturdy ⅝" spindle . . . 100% more power . . . covers 52% more working area. Avoids stalling . . . outlasts machines of similar size. Guaranteed.

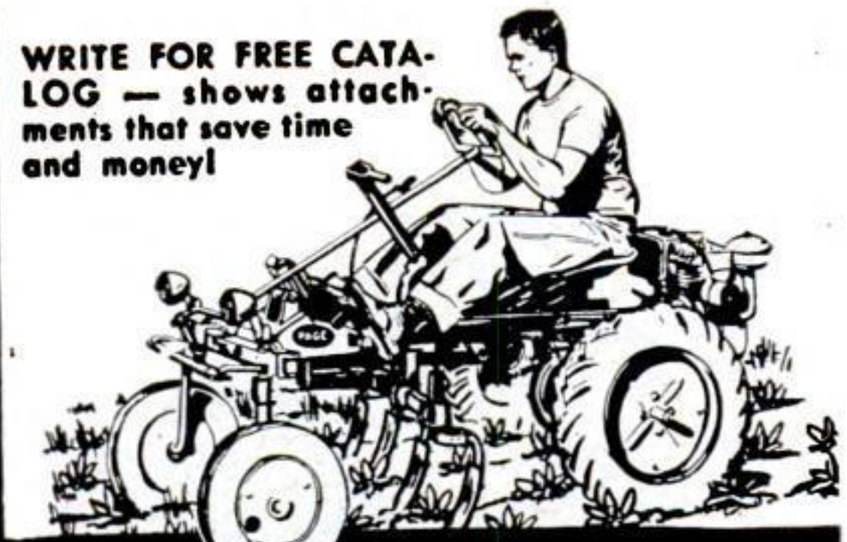
1. **SHOP KIT** (illus.)—For homecraft and light industrial use. Sands, grinds, wire brushes, drills, mixes, cuts, buffs, polishes, etc. Includes bench stand and metal case. . . . . Only **$69.50**
2. **HOME KIT**—Polishes floors, furniture, cars, silverware; sharpens tools, knives. Sands wood, buffs, wire brushes, etc. Includes bench stand and metal case. Only **$59.50**
3. **PAINTERS KIT**—Does heavy and light sanding, removes paint, wire brushes, mixes paint, cuts light metal, cleans up tile, etc. Includes metal case. Only **$59.50**

A REAL BUY! At leading hardware and mill supply dealers, or write . . .

PORTER-CABLE Machine Co.
2005 No. Salina St. Syracuse, New York
Mfgrs. of GUILD and SPEEDMATIC Electric Tools

Do it *Faster* and *Easier* with the

WRITE FOR FREE CATALOG — shows attachments that save time and money!



PAGE Garden Tractor

New 1949 line with extra features! Riding and walking models, 1½ to 5 HP. Complete gear drive, no cheap belts or chains. Large tires—high clearance—easy to handle—power turn. Low factory prices—$188 to $436 with cultivator. Get benefits of 24 years of garden tractor experience!

PAGE DAIRY and FARM EQUIPMENT
1916B S. 81st STREET • MILWAUKEE 14, WIS.

HEAVY CAST ALUMINUM BLOWER ONLY $10

SINGLE EXHAUST BLOWER DELIVERS APP. 100 CU. FT. AIR PER MINUTE.

For Workshops, Labs, Kitchens, Cellars, Electronic Tube cooling or any use where airblowers are needed. Install it yourself with any household tools. 110 V., A.C., 50-60 cycles. Cont. duty motor.

Double Exhaust Blower. 2 heavy cast alum. housings. Double intake and exhaust. **$15.** Shipped P.P. Pay slight charge on arrival. Check, M.O. Moneyback Guar. Send for circular on complete line of Blowers.

UNIVERSAL YONKERS CORP.
137 Alexander St. (S-5) Yonkers 2, N. Y.

DIAL your SAW CUTS!

AMAZING NEW

Warren

DADO SAWING WASHERS MAKE ALL THESE CUTS ON *YOUR* SAW!

Smooth, accurate grooves—12 widths, any angle. No chatter, no burning, chewing, or sanding! Just dial desired width with Micromatic adjustment! 5 sizes fit any saw arbor—½", ¾", ⅝", 1", 1⅛". See your dealer or use coupon below! Satisfaction guaranteed.

DEALERS, ORDER DIRECT!

$4.95 set

pat. pend.

WARREN WASHERS CO., DEPT. 45
70 Medbury Ave., Detroit 2, Michigan

Enclosed $4.95 for one set of Warren Washers, postpaid. My arbor size is_____

NAME_____

ADDRESS_____

CITY_____ STATE_____

Copyrighted material

Choose Your "22" From This Great Line-up

FIRST IN THE FIELD

MAN-SIZED STOCKS
Stocks and forestocks of Savage and Stevens "22" rifles are full size, attractively finished, and properly proportioned for steady holding.

No. 150
MICRO PEEP SIGHT
with
HOODED FRONT SIGHT
Micrometer elevation and windage adjustment. Precision built. Helps build top marksmanship.

TENITE
The beautiful, durable, service-proven gunstock material—permits custom stock features and appearance on guns priced with the lowest. Now available on the Stevens model 87 (illus. at left) as well as other Stevens rifles and shotguns.

Lightning fast, lightweight automatics... accurate, well balanced repeaters (*both* clip and tubular magazine models)... sturdy, dependable "single shots". Take your pick and *pick a Savage or Stevens* "22" rifle for highest quality—greatest value. See these models at your dealer's—write for free catalog.

SAVAGE ARMS CORPORATION
Firearms Division **Chicopee Falls, Mass.**

STEVENS
PIONEERING BETTER GUNS AND GREATER VALUES SINCE 1864

SAVAGE
WORLD FAMOUS FOR DEPENDABILITY AND ACCURACY

STEVENS .22 Rifles—First in value

Model 86 — .22 cal. Bolt Action Tubular Magazine Repeating Rifle. Magazine holds fifteen .22 long rifle; seventeen .22 long or twenty-one .22 short cartridges. Military style stock with pistol grip.

Model 84 — .22 cal. Bolt Action, Clip Magazine Repeating Rifle. Detachable clip holds five .22 long rifle; .22 long or .22 short cartridges. Self-cocking, bolt action. Independent safety.

Model 15 — .22 cal. Bolt Action, Single Shot Rifle. Chambered for .22 long rifle; .22 long or .22 short cartridges. The lowest priced lightweight "22" in the field.

Model 87 — Semi-Automatic .22 cal. Rifle. Shoots 15 shots as fast as trigger can be pulled. Also, instantly adjustable as single shot or bolt action repeater, shooting .22 long rifle; .22 long or .22 short cartridges.

Stevens Models 86S - 84S - 87S; same as above with No. 150 Micro Peep Sight with Hooded Front Sight illustrated above.

SAVAGE .22 Rifles—First in quality

Model 6 — .22 cal. Auto-Loading Rifle — shoots fifteen long rifle cartridges as fast as you can pull the trigger. Also, instantly adjustable as bolt action repeater; shooting .22 long rifle; .22 long or .22 short cartridges.

Model 5 — .22 cal. Bolt Action Tubular Magazine Repeating Rifle. Magazine capacity — fifteen .22 long rifle; seventeen .22 long or twenty-one .22 short cartridges.

Model 4 — .22 cal. Bolt Action 5-shot Clip Magazine Rifle. Chambered for .22 long rifle; .22 long or .22 short cartridges. Stock and forestock of walnut.

Model 3 — .22 cal. Single Shot Bolt Action Rifle. Shoots .22 long rifle; .22 long or .22 short cartridges, regular or high speed. Positive safety. Walnut stock and forestock.

Savage Models 6S - 5S - 4S - 3S; same with No. 150 Micro Peep Sight with Hooded Front Sight illustrated and described above.

Copyrighted material

Time for your SPRING PurOlator-Change

A CLOGGED OIL FILTER IS DANGEROUS. Engine-wrecking sludge and abrasives threaten sizable repair bills.

"MICRONIC" CONSTRUCTION MAKES THE DIFFERENCE. Pores so tiny they trap *all* the sludge, all the abrasives.

INSTALLED IN A FEW MINUTES —and now you can be sure that your oil will stay cleaner, your engine will be safer.

COSTS SO LITTLE . . . *and* can save so much in engine repairs. Only $1.38 to $2.50, depending on make of car.

Make the Spring changeover complete . . . new oil *and* a clean oil filter. Put in a Purolator "Micronic" Refill. Purolator, remember, is the filter that traps *all* the engine-wrecking sludge and abrasives.

Purolator "Micronic" Refills fit *all* oil filters. $1.38 to $2.50, depending on make of car; inserted in a few minutes. If your car is *not* equipped with an oil filter, install a Purolator. $6.50 up, also depending on make of car.

PurOlator
MICRONIC OIL FILTER

. . . the oil filter that traps all the abrasives, all the sludge

Ball-Bearing SPEED WHEELS

Juvenile Wheels
(No bearing, solid tires)

5" .....45c 6" 65c
7".....75c

(Semi-pneumatic tire, ball bearing)

8 x 1.25.....1.85 10 x 1.25.....2.20
8 x 1.75.....1.95 10 x 1.75.....2.30
8 x 2.....2.20 12 x 1.75.....3.45

Industrial Wheels for Heavy Loads

5 x 1.75 Bolted..3.65 10 x 2.75 HC....5.70
6 x 2 Welded....3.45 10 x 2.75 Pne....7.60
6 x 2 Bolted.....4.35 12 x 2.00.....6.90
8 x 1.....5.25 12 x 3.00.....10.60
8 x 2.00.....5.20 4.00 x 8-2.....14.70
8 x 2.50.....5.40 4.00 x 8-4.....15.85
10 x 2.00.....6.10 16 x 4.00.....15.15

Dealers, Jobbers, and Manufacturers! Our new prices will interest you.

WRITE US NOW FOR COMPLETE NEW CATALOG
Send check with order. No C.O.D.

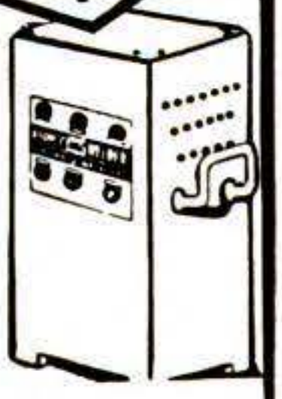
JIM BROWN TOY COMPANY
1093 Home Ave. Akron 10, Ohio

LEARN WELDING AT HOME

60 LBS. OF READY MADE PARTS Only $24.95

BUILD YOUR OWN HEAVY DUTY WELDER

SAVE! BUY ONLY NECESSARY PARTS



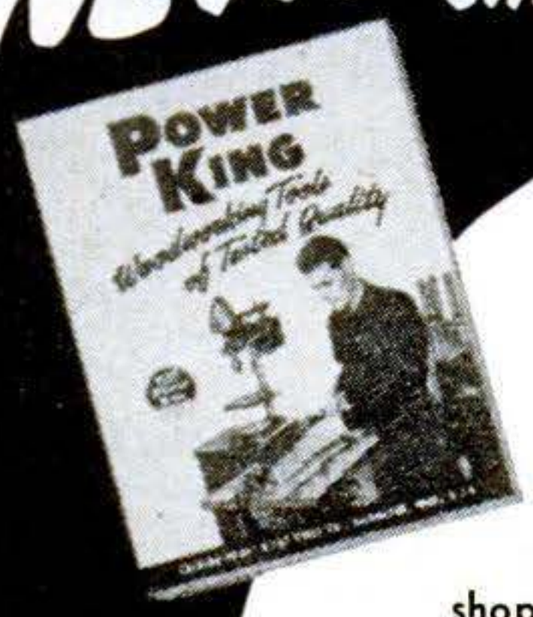
Heavy Duty transformer coils ready wound. Laminations ready cut. Five heat stages. Easy to assemble . . . no special tools needed. With only a few hours practice you can do skilled welding on steel, cast-iron and other metals. Illustrated instruction manual included. Sold on 30-day unconditional Money-Back Guarantee.

Gives 100% penetration. Welds are stronger than original metal. Operates on both 110 and 220 AC.

FREE: WRITE TODAY FOR FULL ILLUSTRATED PAMPHLET S-5

ATOMIC ARC WELDER CO., 1039 So. 19th St., Omaha, Nebr.

NEW! POWER KING CATALOG AND SHOP HINTS!



Just off the press! Send today for this unusual new Power King catalog. Gives you complete information about Atlas-built low-cost Power King tools for your shop plus helpful hints on types of joints for furniture and other projects. Gives facts about various woods, lists and describes Atlas Easi-Bild patterns. Write today.

SEND THIS COUPON FOR YOUR COPY

NAME _____
ADDRESS _____
CITY _____
STATE _____

ATLAS PRESS CO.
542 N. Pitcher St., Kalamazoo, Mich.

Atlas POWER KING

MATCHED PRECISION TOOLS FOR WOODWORKING AND METALWORKING

Copyrighted material

DEPENDABLE

CHAMPION

SPARK PLUGS

← America's Favorite!

"It's Spring—Let's go" is the friendly reminder you'll see at gas stations and service garages everywhere . . . a friendly reminder to you that your winter-weary spark plugs should be checked and cleaned . . . may even need replacement. Spark plugs are vitally important to every phase of performance of your car at all times, and a new set of Champions represents the ultimate in quality, value, performance and dependability. That's why engine experts, like most racing champions, will use no others . . . why they are America's Favorites. Champion Spark Plug Company, Toledo 1, Ohio.

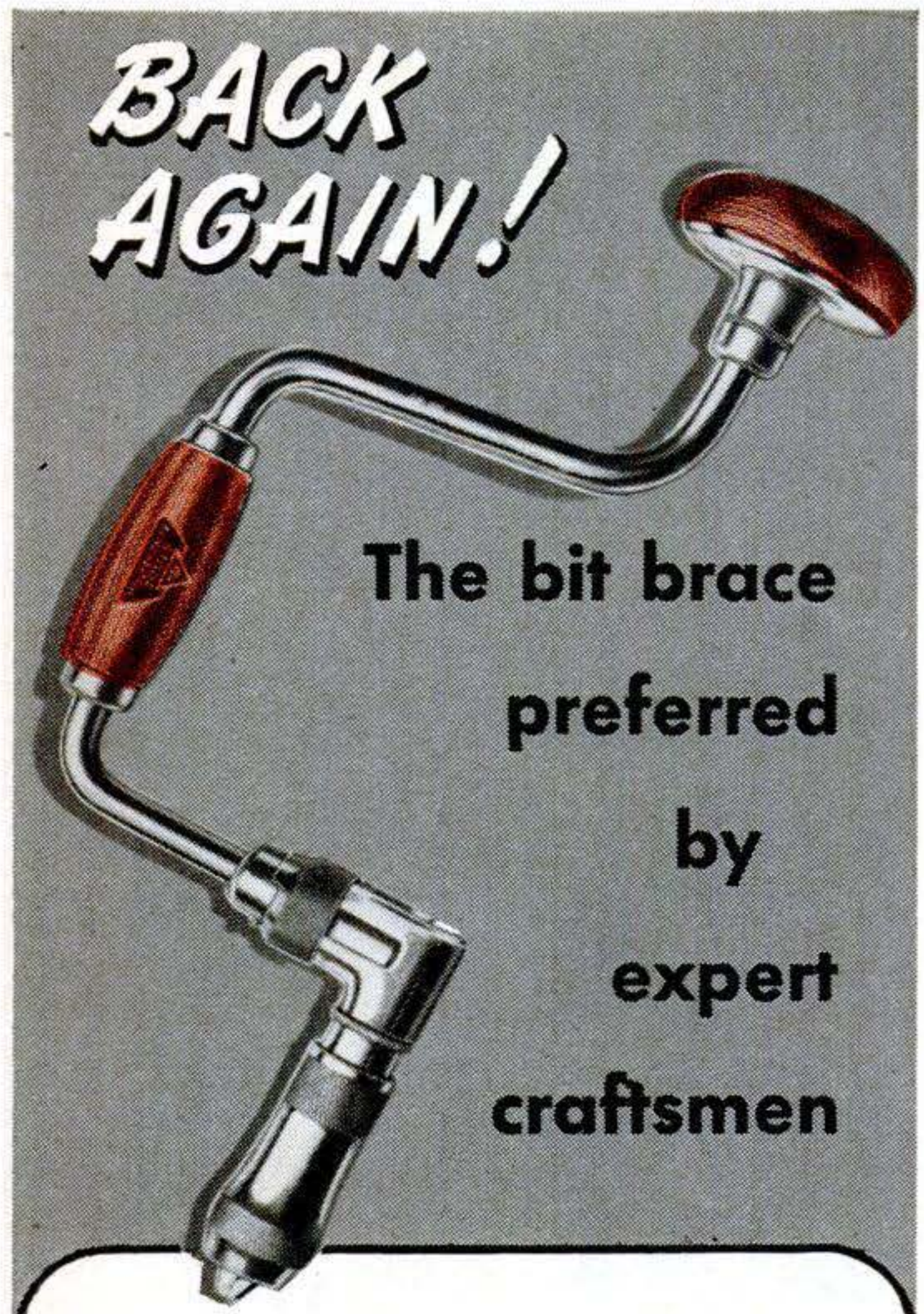
FOLLOW THE EXPERTS

DEMAND DEPENDABLE CHAMPIONS FOR YOUR CAR

Listen to the CHAMPION ROLL CALL . . . Harry Wismer's fast sportscast every Friday night, over the ABC network

Copyrighted material

BACK AGAIN!



The bit brace preferred by expert craftsmen

When a hand tool becomes so well known that craftsmen call it by number, you can be sure it's a tool of unusual quality. That's why expert carpenters and cabinet-makers everywhere are welcoming the return of the No. 32 Millers Falls bit brace.

Yes, No. 32 is back again — with its fine construction, highly polished buffed nickel finish, tropical hardwood sweep handle and head. No. 32 is the country's standard 10-inch quality brace.

Find out what we mean. Ask your hardware dealer to show you the No. 32 bit brace. At the same time see some of the other Millers Falls quality tools. Millers Falls Company, Greenfield, Mass.

MILLERS FALLS TOOLS

SINCE 1868

World Famous EASY TO ASSEMBLE

PACKAGED BOAT KITS

New 1949 line—18 models—8 to 18 Ft.

1949 line features many new models offering increased performance and greatly simplified instructions. Low prices! 8 ft. Dinghy $34.50, 16 ft. Runabout $159. Dinghies, Skiffs, fishing and speed boats for the home builder.

ALL PARTS PRE-CUT, FRAMES PRE-ASSEMBLED

Only the simplest tools are required. Simplified building instructions. Precision cut parts.

SEND 25c (coin) for literature, or send $1.00 for literature plus booklet "Plywood Boats".

BOAT PATTERNS-BLUE PRINTS

100 designs by Deed, Lord, Crandall, etc., plank, steel, and plywood types 6-35 ft. Detailed blueprints, full-size paper patterns. **Catalog 35c (coin). Catalog and booklet "Boat Building" $1.00.**

PLYWOOD CONVERSIONS HARDWARE

—and Marine lumber. Stock list 10c. List and handbook "Plywood Hints" 50c (coin).

Drives, gears, engines, kits. Catalog 50c (coin). With booklet "Conversion Hints" $1.00.

Send $1.00 for 250-page Builders Guide. 15,000 items pictured, priced.

MARINE MART-DEPT. 23-BUFFALO 7, N. Y.

Catalog FREE

BINOCULARS

10x50 MILITARY WIDE ANGLE IND. FOC. $55

8x32 COATED CENT. FOC. $39.50

6x30 GERMAN FEATHERWEIGHT CENT. FOC. $37.50

20% Federal Tax. Leather Cases Incl.

We pay postage—Brand new—Money back guarantee.

BROWNSCOPE CO.

Dept. 5P, 24 West 45th St., New York 19, N. Y.

Only $16.95 Complete

DUAL PURPOSE SPRAY GUN

Uses Only 25 lbs. Air Pressure
FLOCKS and SANDBLASTS

AT HOME: You can refinish Lamps, Radios, Book Ends, Statues and hundreds of things with lovely colorful flocking. ETCH GLASS: Many designs and initials can be sandblasted on shower doors, ash trays, glassware. AUTO INTERIORS: Transform ugly dirty auto interiors to "new car beauty" with a BLASTO DUAL PURPOSE SPRAY GUN. Merely spray flock similar to Velvet, Plush, Suede and Mohair inside your car. ANTIQUE WOOD . . . REMOVE PAINT. MAKE EXTRA MONEY by doing any or all the above for profit. BLASTO is highest quality and carries a 5 day money-back guarantee. Operates on small air compressor. Send $16.95 cash, check or money order for postpaid delivery. Write for free information. Full line of Flocking Supplies.

BLASTO SPRAY GUN MFG., Dept. PS-5 7007 Haas Ave., Los Angeles 44, Calif.

AMAZING NEW SAFE JIG SAW READY!

At last — a revolutionary, new electric jig saw small children may use, yet powerful enough to be the basic tool in Dad's workshop. Make "Standing Photo Silhouettes" of favorite snap shots . . . fancy what-nots, toys, for fun and profit! Just plug in! No motor to buy—no oiling. Thousands sold. Use in livingroom, apartments, etc. Patented. Nothing else like it. Mail postal NOW for illustrated, Free Circular, low price!

FREE Circular!

SYNCRO

Dealers Write!

SYNCRO CORPORATION Dept. M-59 Rochester, Mich.

Copyrighted material

Replace with a

DELCO BATTERY

for GOOD SERVICE

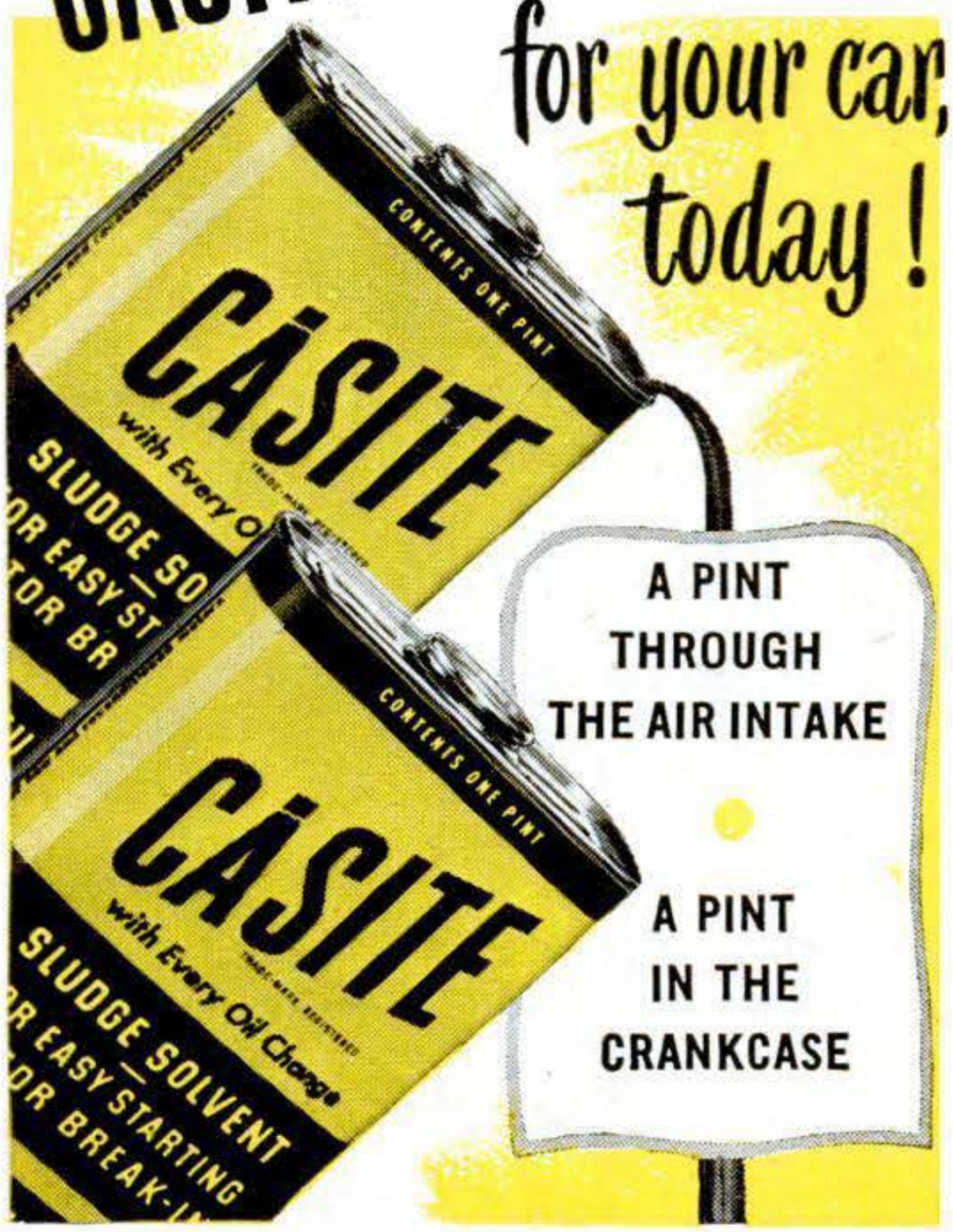
for a LONG TIME

DELCO BATTERIES FOR PASSENGER CARS, TRUCKS, BUSES AND TRACTORS ARE SOLD BY DELCO BATTERY DEALERS EVERYWHERE

DELCO-REMY *WHEREVER WHEELS TURN OR PROPELLERS SPIN*

Copyrighted material

Get a CASITE TREATMENT for your car, today!



You'll take to the road with a load off your mind—after a Casite Treatment. It releases power . . . removes binding goo . . . relieves sticky valves and rings.

A Casite Treatment cleans your engine, keeps it clean, slows formation of sludge and gum. When added to any motor oil, Casite gets it around quickly and into the tight spots, retarding wear, cutting repair bills.

Your garage, service station, or car dealer will give you a Casite Treatment today—at a very low cost.

THE CASITE CORPORATION
HASTINGS, MICHIGAN
Casite Division, Hastings Ltd., Toronto

BETTER AND SMOOTHER PERFORMANCE OR *Double-Your-Money-Back*

HOW-TO-DO-IT WOODWORKING PLANS

FREE for the home carpenter. Now, by following these simplified blueprint plans, you can easily make attractive tables, chairs, shelves, bookcases, cabinets, etc. *right in your own workshop.*

You also get a full size bottle of Rogers "Gorilla Grip" Glue . . . the glue with a ton of strength in every drop . . . Tops for furniture repairs and construction.

Take advantage of this special offer . . . send 10c today to Rogers Isinglass & Glue Co., Gloucester, Mass.

ROGERS
the best LIQUID FISH GLUE
GLOUCESTER, MASS.

SAVE TIME, WORK, MONEY!

SHAW "DU-ALL" W
and "PEPPY PAL" TRACTORS

PLOW

CULTIVATE

These rugged walking or riding tractors are ideal for farm, truck garden, orchard, poultry farm. Operate on a few cents an hour. A child can handle them.

DO DOZENS OF JOBS Both riding and walking tractors quickly and easily plow, cultivate, harrow, disk, bulldoze, spray, haul, grind, saw wood, etc.

LOW FACTORY PRICES Buy direct or thru your dealer. Year's guarantee.

RIDING TRACTORS Four models from 5 to 12½ H. P., 58 in. wheelbase, 36 to 52 in. wide, 24 in. plant clearance, Hand or electric starter. Walking Tractors 1½ to 5 H.P.

FREE Illustrated folders giving complete details, price list—write today.

SHAW MFG. CO.
5705 Front Street, Galesburg, Kans.
668PS North 4th Street, Columbus, O.

30" SHEET METAL BRAKE

Forms angles, channels, vees, flanges, locks, zees. Handles 26 gage sheet steel, heavier gages of aluminum, copper, plastic, etc. Portable. Can be held in a bench vise, or bolted down. All steel. Wt. 40 lbs. Shipped exp. collect. **$24.50**

12" BRAKE. Fits in vise to form difficult and compound bends, up to 20 gage steel 12" wide.....$12.50 PP.

SHEET METAL PLIERS. 2½" wide, $2.00; 5", $3.50.

Immediate delivery. Order direct, cash or C.O.D., or send for folder.

VISE BRAKE MFG. CO.
1116 So. 27th St. Dept. S-5 Omaha 5, Nebr.

FIREARMS and SWORDS

You don't want to miss our new thrill-packed catalog. Fascinating background and illustrations of 3300 authentic pieces. Exceptional values in hard-to-find items. For your 180 page catalog, simply send 50c to cover postage and handling, with your name and address, to

ROBERT ABELS, Box PS,
860 Lexington Avenue New York 21, N. Y.

"1949" MODERN MOWER

ALL PURPOSE Rotary Lawn Mower

Does a smooth clean job on the finest lawn and will also cut tall grass and weeds along fences, alleys, etc. Light weight, sturdy aluminum chassis. Timken bearing spindle. Ball bearing wheels with semi-pneumatic tires. Available with or without engine. Write for free Circular.

CAN YOU SELL? Ask about our special offer to dealers and salesmen.

AIR-ELECTRIC MACHINE CO., Inc.
LOHRVILLE 3, IOWA, U.S.A.

Copyrighted material

You rip or cross-cut work on the circular saw

You plane it smooth on the jointer

Its extra convenience cuts costs and boosts output for:

- Builders
- Cabinet Shops
- Pattern Shops
- Furniture Makers
- Other Woodworking Plants

DELTA MILWAUKEE®

DELTA-MILWAUKEE® Saw-Jointer Combination

Two machines mounted together... to save space, time, and money

Send for free copy of catalog B-481

Circular saw and jointer are mounted on one steel stand. 10" saw blade cuts 3¼" stock. Rips to center of 50" panel. Jointer surfaces boards 6" wide; cuts rabbets ½" deep. Saw table tilts 45° to right. Both tools have lubricated-for-life ball bearings.

Either machine may be used singly or both together —by one man or two. There is no interference between saw and jointer. Both are driven from below by the same motor. You save the extra cost of an additional motor — and enjoy lower power costs.

See this Delta-Milwaukee Saw-Jointer Combination at your nearby Delta distributor. Look for his name under "Tools" in the classified section of your telephone directory. Ask him about buying on easy credit terms.

TEAR OUT COUPON AND MAIL TODAY!

DELTA MANUFACTURING DIVISION
Rockwell Manufacturing Company
6828-E E. Vienna Avenue
Milwaukee 1, Wis.

Send me free copy of Delta-Milwaukee catalog B-48.

Name.....
Title.....
Company.....
Address.....
City.....(.....) State.....

HM-68

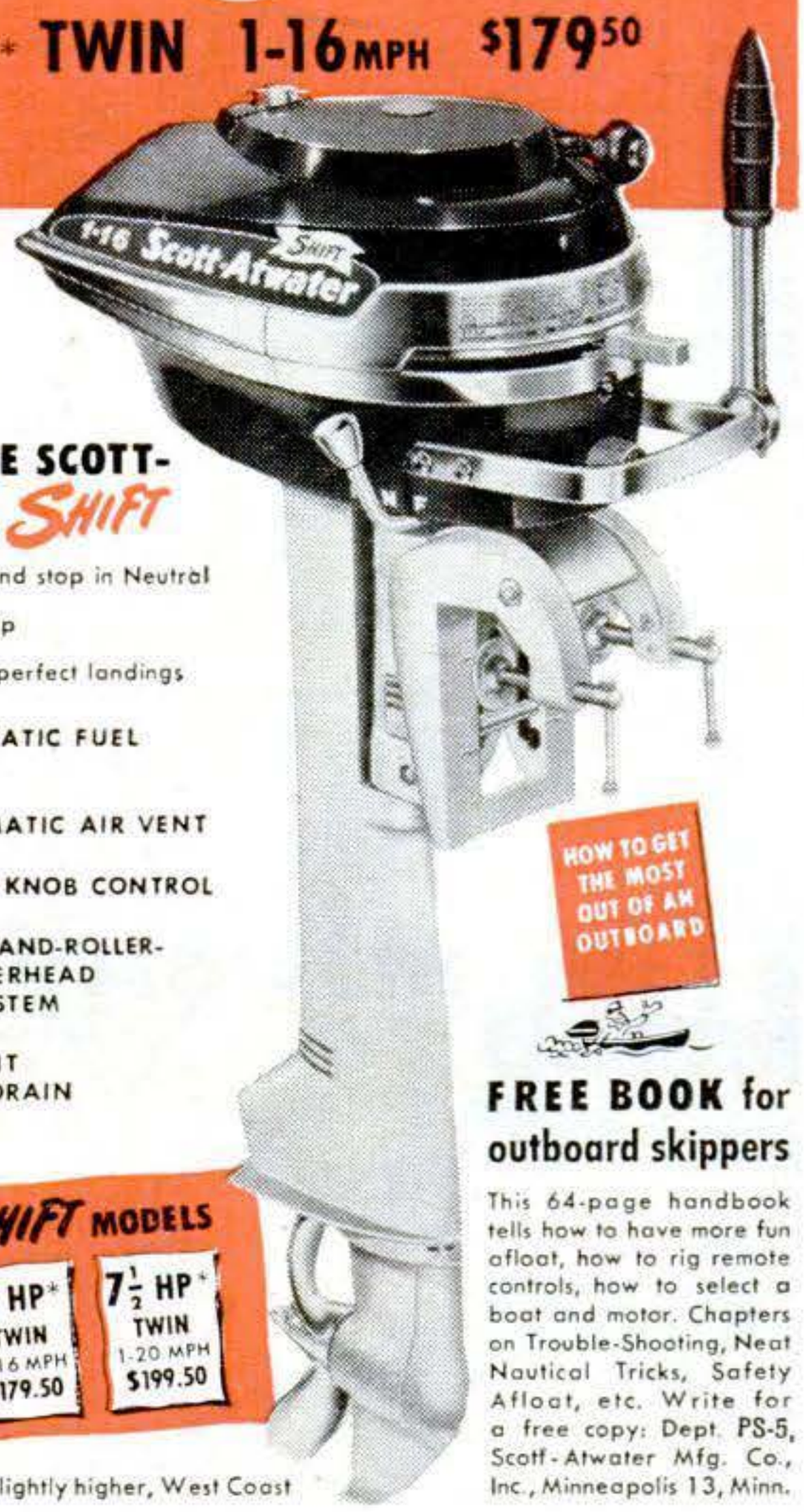
Copyrighted material

Here's America's most advanced outboard!

THE SENSATIONAL NEW

Scott-Atwater 1-16 SHIFT

5 HP* TWIN 1-16 MPH $179.50



- IT HAS THE SCOTT-ATWATER SHIFT
  - SHIFT to start and stop in Neutral
  - SHIFT to back up
  - SHIFT to make perfect landings
- IT HAS AUTOMATIC FUEL SHUT-OFF
- IT HAS AUTOMATIC AIR VENT
- IT HAS SINGLE KNOB CONTROL
- IT HAS A BALL-AND-ROLLER-BEARING POWERHEAD AND GEAR SYSTEM
- IT HAS INSTANT CARBURETOR DRAIN

THREE SHIFT MODELS

4 HP* SINGLE 1-14 MPH $149.50	5 HP* TWIN 1-16 MPH $179.50	7½ HP* TWIN 1-20 MPH $199.50

4 and 5 HP models slightly higher, West Coast

HOW TO GET THE MOST OUT OF AN OUTBOARD

FREE BOOK for outboard skippers

This 64-page handbook tells how to have more fun afloat, how to rig remote controls, how to select a boat and motor. Chapters on Trouble-Shooting, Neat Nautical Tricks, Safety Afloat, etc. Write for a free copy: Dept. PS-5, Scott-Atwater Mfg. Co., Inc., Minneapolis 13, Minn.

YOU'VE NEVER SEEN an outboard like this. It gives you cruiser control with the Scott-Atwater SHIFT—just SHIFT to Neutral, Reverse and Forward. It gives you the latest, greatest features — Rubber-Cushioned Shock Absorber Drive, Rotoflex Water Pump, Duo-Grip Carrying Handle, New Slip Clutch, Full-Expansion Exhaust—*plus all those above!* Yet the revolutionary Scott-Atwater 1-16 SHIFT actually costs no more than an old-fashioned outboard!

OBC

*OBC Certified @4200 RPM

SHIFT

For information write Dept. PS-5, Scott-Atwater Mfg. Co., Minneapolis 13, Minn.

to Scott-Atwater

Low-Priced ROTARY TILLER

Unsurpassed for Tilling and Cultivating

The Mulsifier Soil Tiller! Makes it easy to work 1 to 20 acres of common crops. Pulverizes the soil as fine as if it were plowed, disced and harrowed. Spreads fertilizer as it tills. Ideal for cultivating. Has adequate power for all workable soils. Travels at speeds up to 2½ miles per hour. Nothing to do but guide it. Compact—can be carried in trunk of car. Completely equipped—no extras to buy. Sells at a fraction of the price of a tractor. Send postcard for circular.

MULSIFIER CORPORATION

7760 HAMILTON, DETROIT 2, MICH.

*Trade Mark Reg. U. S. Pat. Office

Free CIRCULAR

Mulsifier* ROTARY SOIL TILLER

SPEED ALL PURPOSE HANDLE

TOOL OF 101 USES!

Holds files, razor blades, taps, drills, allen wrenches, bits . . any shape shank, flat, oval or round. Operates similar to a drill chuck. Precision made. The handiest tool in your tool box.

PAT. NO. 2253990

ORDER NOW! . . . $1.00 Post Paid

SPEEDCOR PRODUCTS

2025 N. E. Sandy, Portland 12, Ore.

MINIATURE JET ENGINE

Know the Thrill of Flying a Jet

You can speed your model through the sky with a powerful jet engine. The product of years of research and development. Completely assembled ready to install. Precision construction. Uses gasoline for fuel. 2 inch diameter, over 2½ lbs. static thrust.

$15.00

If your dealer can't supply you order direct.

MINIJET SALES CO. P.O. Box 406,, PASADENA, CALIF.

EASIEST, SUREST WAY TO END DIRECTION WORRIES—*Drive with a*

HULL AUTOMOBILE COMPASS

Beaconlite Illuminated, $5.95

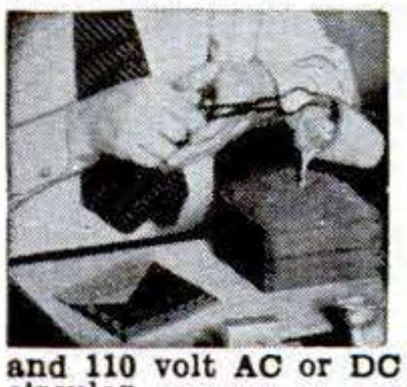
Streamline Standard, $3.95

At your dealer's. Write for circular.

HULL MFG. CO., P. O. Box 246-E5, Warren, Ohio

Sand Casting—Forging—Heat Treating—Case Hardening

BRONZE FOUNDRY



In your own workshop allows you to design and build your own GASOLINE ENGINES, STEAM ENGINES, STATUARY, ART OBJECTS, SPECIAL TOOLS, NEW INVENTIONS, ETC. You can also make forgings and case harden steel. Your shop is not complete without a FOUNDRYETTE. Three sizes are available capable of making bronze castings of 1½, 3 and 6 pounds weight, aluminum, copper, brass, etc., $22.50, $29.50, $42.00 f.o.b. Kansas City. Domestic gas supply and 110 volt AC or DC energy required for operation. Write for circular.

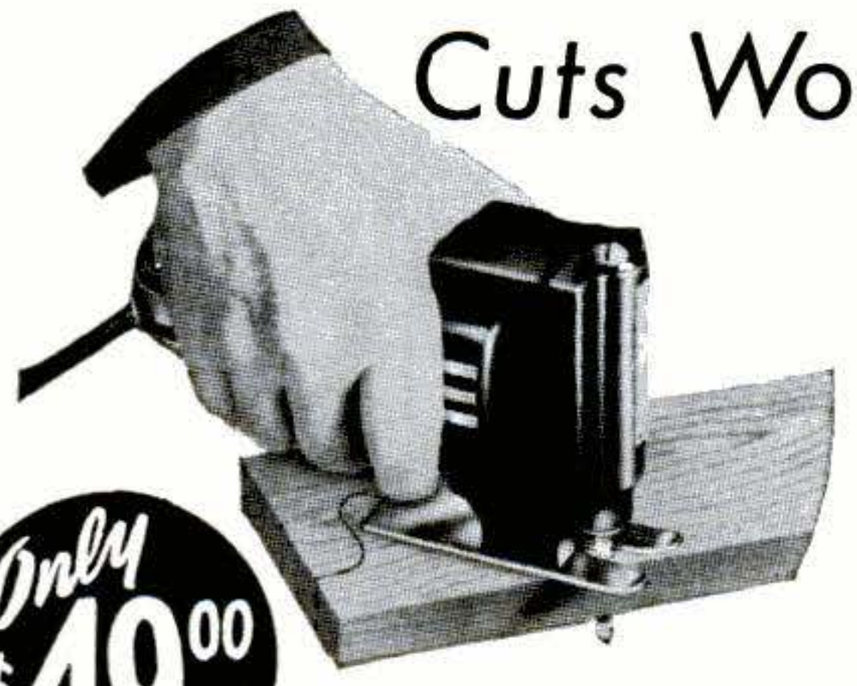
KANSAS CITY SPECIALTIES CO.

Box 6022, Dept. S-4 Kansas City, Mo.

Copyrighted material

HAVE FUN, MAKE MONEY WITH AMAZING *NEW* WHIZ-SAW

Cuts Wood like Scissors cuts Paper



Only $49.00

POWER-PACKED portable electric key hole saw makes woodworking simple! Saves you hours of back-breaking work in the home, on the farm, in light industrial use. Compact, small, light, easy to handle. Safe to use. Hold like gun in palm of hand. Saws wood and most plastic, hard rubber, bakelite, fibre, asbestos, board, bone, masonite into **any** shape. Cuts in any direction. Makes mortises, notches, jigs. Ideal for use in shops, garages, home workshops, hobby shops. Does work in matter of seconds, where ordinary key hole saw takes some times longer.

Adapted for Skilled Tradesmen; Invaluable Tool for Carpenters, Pattern Makers, Model Makers, Hobbyists

Plumbers can cut holes for pipe fittings in a few seconds. Electricians cut holes for outlet boxes quickly and accurately. Handy for laying linoleum and asphalt tile. A thousand and one uses. Excellent tool for precise jobs in home and shop. Build cabinets, tables, shelves, cupboards, fences, sheds, garages, window screens, outdoor and indoor furniture. Save hundreds of dollars each year in your own shop.

Carpentry

Blade Packs a Wallop

Cuts through board any length up to 1 inch thickness. Eliminates the necessity of drilling a starting hole. Does cross cut, rip. Cuts intricate curves allowing ¼ radius turns. Accurately machine ground teeth insure maximum in cutting efficiency. Blades can be resharpened. Swedish alloy steel precision blade stays sharp—cuts fast and easy. Won't buckle. Hard and tough. Quick, clean, smooth cuts. Truly a woodworker's delight.

Pattern Making

Motor Unsurpassed for long and dependable service

Whiz-Saw has patented counterbalancing mechanism which eliminates vibration. A new universal fractional H.P. motor delivery 3250 cutting strokes per minute. A full dust-sealed ball bearing motor with 7 precision Big bearings. Trouble free motor guarantee for 30 days of use against mechanical defects. Lubricated for life. Tested at 1000 volts. Delivers 14,000 R.P.M. The only saw of its kind made. Only $49.00.

Furniture Building

SPECIFICATIONS

1/10 H.P.—A.C. or D.C. Current
115 Volts—60 cycles
100 Watt output—1.5 Amps
14,000 R.P.M. with no load
13,000 R.P.M. with full load
3,250 Blade Strokes per minute
Tested at 1,000 Volts
Capacity 1/16 to 1" thickness
Full ball-bearing motor
Needle Bearings in Gear Head
Oil-less Bearings on Reciprocating Shaft
No Oiling Necessary
Attachment Cord 7 Ft. long
Whiz-Saw Weight 3½ pounds
Packed one per box with 2 extra blades.

Truck and Trailer Bodies

Model Making

Sign and Display Making

Hobby Work

TESTIMONIALS

This is what they tell us:—

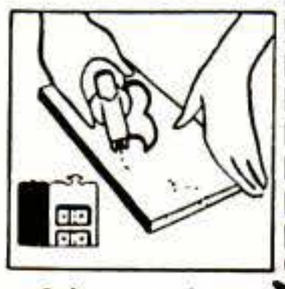
ELECTRICIAN
Cannot be surpassed for cutting outlet boxes. —A.V.C., Bridgeport, Conn.

PLUMBER
Just the tool for cutting holes through floors in plumbing work. —C.B., Stratford, Conn.

HEATING ENGINEER
Perfect for cutting air duct holes for hot air heat and air conditioning. —J.P.R., New York

HOBBYIST
Handy for all hobby work, especially cutting intricate shape. —A.P.A., Wilmington, Ohio

Electrical Work



Cabinet Making

ORDER NOW ON FREE TRIAL

Simply mail coupon with $5 deposit (check or money order). Pay postman only $44.00 for Whiz-Saw (plus postage). If not THRILLED with this astounding WHIZ-SAW, just put back in box and return at our expense within 5 days. We refund your purchase price at once.

THE *Forsberg* MFG. CO.
BRIDGEPORT, CONN., U.S.A.

MAIL COUPON NOW

FORSBERG MFG. CO., Dept. PS, Bridgeport, Conn.

☐ Here is my $5 deposit (check or money order) for Whiz-Saw.
☐ I will pay postman $44.00 plus C.O.D. fees and postage for Whiz-Saw.
☐ Save postage and C.O.D. fees. WE pay postage if you remit **now** in full. (Money back either way if not delighted.)

Name.....

Address.....

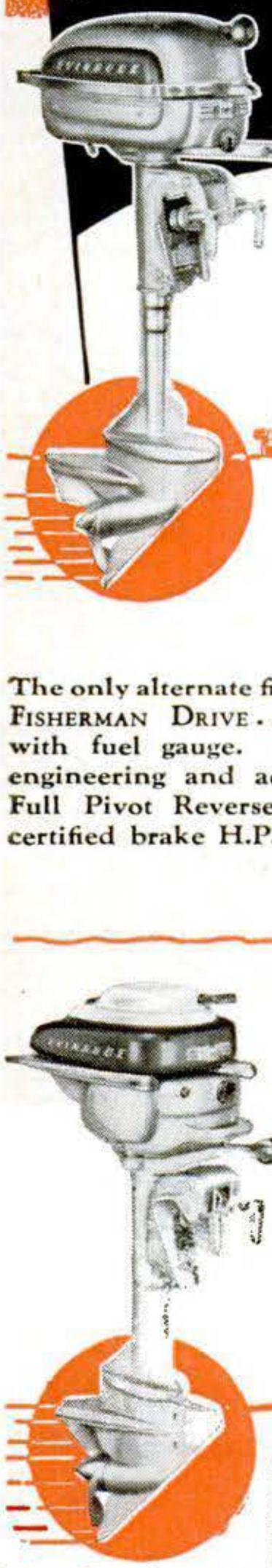
City & Zone.....State.....

Copyrighted material

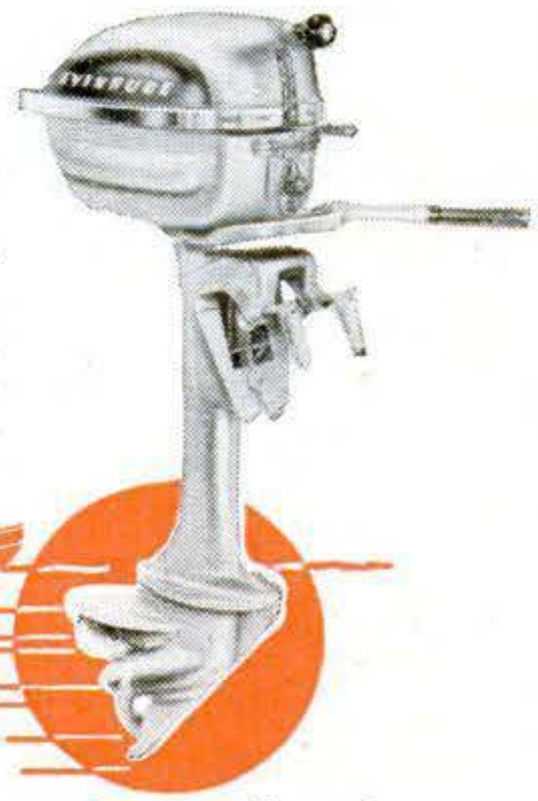
EVINRUDES with Fisherman Drive

The *only* motors that let you go *anywhere*

...over snags, rocks, shoals, thru thick weeds..... ANYWHERE there's water to float your boat!



SPORTSMAN—The only light "Single" with FISHERMAN DRIVE. Top choice for small fishing craft, canoes, auto-top and rental boats. Simplex starter, Co-Pilot, Full Pivot Reverse. 1.5 O.B.C. certified brake H.P. at 4000 R.P.M.



SPORTWIN—

The only alternate firing "Twin" with FISHERMAN DRIVE...the only motor with fuel gauge. Years ahead in engineering and advanced features. Full Pivot Reverse . . . 3.3 O.B.C. certified brake H.P. at 4000 R.P.M.

ZEPHYR—The only "Four" with FISHERMAN DRIVE...the only motor that offers four-cylinder performance with freedom to power *anywhere* there's water to float your boat. 5.4 O.B.C. certified brake H.P. at 4000 R.P.M.

See Your Evinrude Dealer...look for his name under "Outboard Motors" in the yellow pages of your phone book. For free catalog of the complete line of 40th Anniversary Evinrude Models—1.5 to 50 certified H.P. —write EVINRUDE MOTORS, 4301 N. 27 St., Milwaukee 9, Wis.

In Canada — Evinrude Motors, Peterboro, Ontario

EVINRUDE

FIRST IN OUTBOARDS...40th YEAR

New War Surplus **HOIST & WINCH**

SMALL BUT MIGHTY!

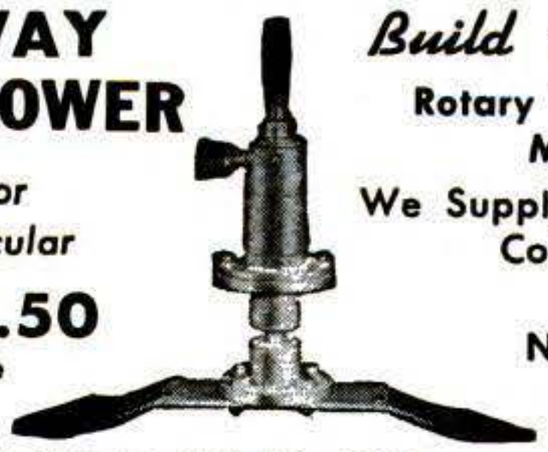
Originally made to be used on B-29s for lifting bombs. Original Govt. cost approx. $100.00. Mounted on a welded steel base 5" wide 12" long, ⅝" thick that can be attached to truck body or any other solid base. Ideal for lifting or moving loads in or onto trailers, trucks or tractors. Excellent for machine shops, garages or warehouses. Can be used to construct portable lifts and cranes. Gear ratio 24 to 1, bronze worm gear driven. Capacity 2,000 lbs. Drum may be disengaged for free wheeling if desired. Equipped with ratchet for holding load. Handle may be set at three different lengths. Equipped with ⅜" steel cable 18 ft. in length with forged steel hook. Housing, cover, and cable drum of aluminum. Working parts of steel with ball bearings and cast bronze graphited bearings used throughout. Actual weight 40 lbs. May be easily moved from one mounting position to another. Shipping wght. in carton 45 lbs., wooden box 50 lbs. F.O.B., K. C., Mo..... **$29.95**

Send check or M.O. for immediate delivery. No COD's.

UNITED AUTO PARTS, INC.

1901 Troost Ave. Dept. P.S. Kansas City, Mo.

NU-WAY LAWN MOWER



Build Your Own

Rotary Type Lawn Mower

We Supply Cutting Unit Complete.

Write for FREE Circular

Price **$12.50**

Why Pay More

NO INCREASE IN PRICE

TRACTOR-LITE MFG. CO., SPIRIT LAKE, IOWA

BUILD YOUR POWER TOOLS

WITH POLY BALL BEARING ARBORS

Model D-12 Pictured

HEAVY DUTY GRINDER

¾" x 17½" precision spindle, self-lubricating ball bearings, heavy casting, V belt, 3 st[illegible] p[illegible], [illegible] driven through rear or base.

ONLY **$18.25**

Ship wt. 13 pounds

FREE! Write for POLY illustrated literature.

C4-½ Pictured

POLY BALL BEARING ARBORS

C4-½ x 12½ spindle, housing 2 x 8, $7.95 pp.
C5-⅝ x 12½ spindle, housing 2 x 8, $8.45 pp.
C6-¾ x 12½ spindle, housing 2¼ x 8, $9.45 pp.
D8-1 x 17½ spindle, housing 2⅝ x 11, $18.75 pp.

SHAPER ARBORS—Free literature on request.

POLY PRODUCTS, 2032-B E. Walnut, Pasadena 8, Calif.

MOTOR WEAR?

Amazing NEW "De-Acid Oil Drain Plug"

reduces acid corrosion. Saves your motor. Does away with up to 90% of engine wear. Protects vital parts. Acts as neutralizer. Acids attack core of plug rather than motor. Easy to install. Safe. Developed by prominent Diesel engineer. Write at once for this wonderful engine saver. Only $2.50. Money back guarantee. State make and year of car.

JOHNS MANUFACTURING COMPANY, Dunellen 2, New Jersey

---

8 ways to make a FRIENDLIER YARD ...JUST 10¢

STANLEY Reg. U S. Pat. Off.

PLAN SET No. 14

• Lure the birds you like by building them a home . . . 5 types plus a feeding box. Plans also for garden seat and a trellis. Hours of pleasure and a better yard. Send 10c for Plan Set No. 14 and list of others. Stanley Tools, 259 Elm St., New Britain, Conn.

Copyrighted material

Polish, Sand and Save with BULL BUFFER!

More than pays for itself the very first time you make your car, boat, floors, woodwork gleam like new!

More than 100,000 enthusiastic users will tell you that Bull Buffer has *everything* you want in a polisher-sander: (1) fits *any* e ectric drill or flexible shaft, (2) *exclusive gear reduction* that gives any drill real power, (3) *exclusive swivel action* that makes it easy to use, (4) *exclusive angle head* that helps get to all those hard-to-reach places other polisher-sanders can't touch.

Bull Buffer is built of lifetime materials and *guaranteed*. Order yours today, at your dealer, or send cash, check, or M.O. for your Bull Buffer, complete as pictured below, only..... **$9.95**

Bull Buffer comes complete with sheepskin bonnet, and 2 sanding discs, only $9.95.

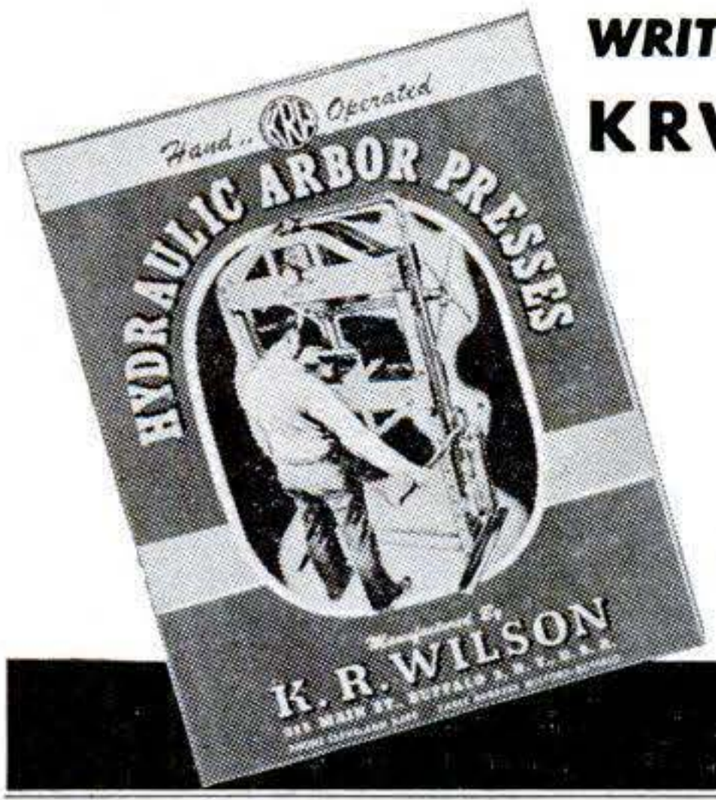
ORDER THESE EXTRA ACCESSORIES FOR YOUR BULL BUFFER

These attachments (see price list below) will fit the Bull Buffer **only.**

½" Jacobs No. 6425 key chuck; with Bull Buffer increases ¼" drill to ½" capacity —reduces speed, increases power	$5.00
Extra sanding discs (0000-000-00-0-1-2½-3-4) each	.10
2½" cup wire brush for removing paint, rust, scale, etc.	1.75
Extra sheepskin bonnet	1.25
Adapter A—for direct drive at "same as" drill speed	1.00
Adapter B Set—for sanding at twice drill speed	2.00
Bull Buffer car cleaner	.50
Bull Buffer car polish	1.00
½" pile wool pad with rubberized back, to be used with cleaning compound, each	1.35

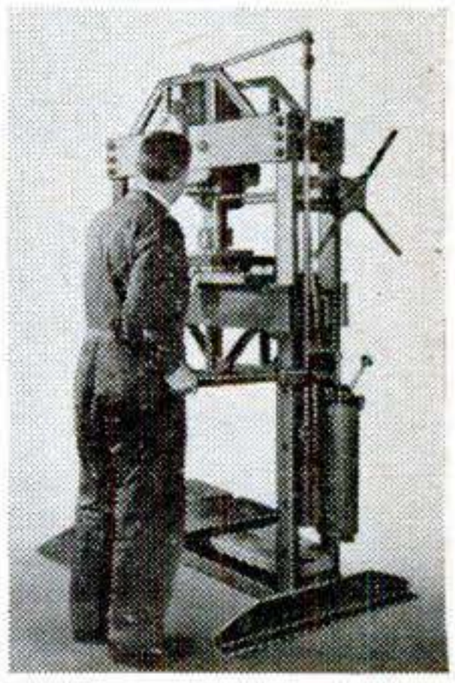
BERTRUM N. ENGINEERING CO.
3121 MAIN STREET KANSAS CITY, MO.
DEALERS WRITE FOR NAME OF NEAREST WHOLESALER

WRITE FOR YOUR FREE COPY OF THE NEW
KRW HYDRAULIC PRESS BOOK

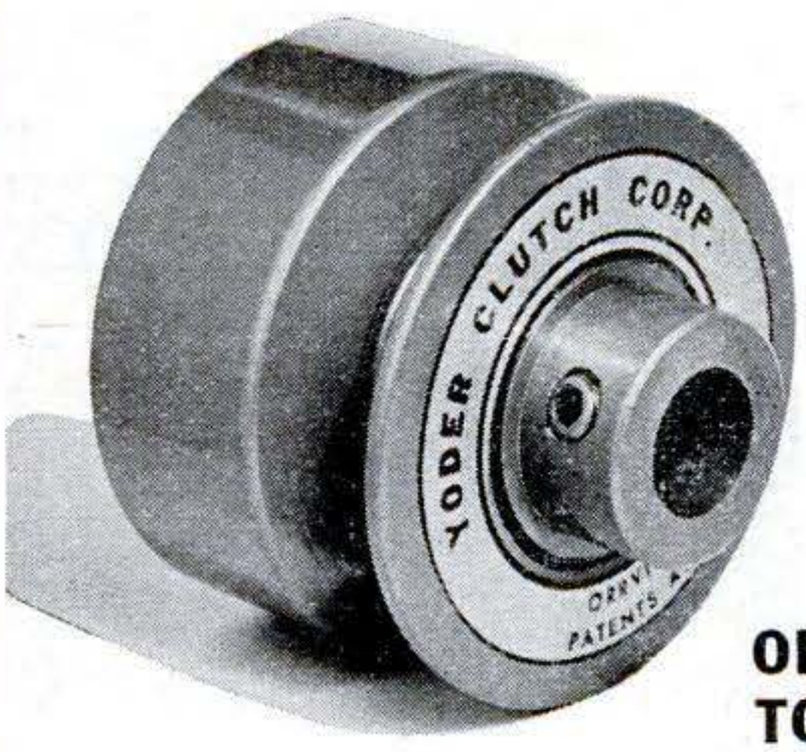


Describes all manner of Production and Shop Work on KRW Hydraulic and Bench Type Presses. 32 pages illustrating the new KRW Hand-operated, Electric-operated and Air-operated Hydraulic Presses. 25 to 100-ton capacities.

Write for your copy today.



K. R. WILSON, DEPT. 54, 215 MAIN ST., BUFFALO 3, N. Y.



NEW AUTOMATIC CLUTCH

Takes Starting Load Off The Motor

USES—Washing Machines—Pumps—Compressors—Sprayers—Motors—Lawn Mowers; **ADVANTAGES**—Compact, Saves Power, No Maintenance, Silent, Low Cost; **SIZES**—2¼" O. D. x 2" P. D. Sheave, ½" or ⅝" Bore; **HOW TO ORDER**—Specify R. P. M. and Shaft Size and whether Gasoline or Electric Motor. See Distributor, Hardware Dealer or Order Direct From Us; **PRICE—$6.00 each,** Money Order or Check—Packed in Cellophane Bag. Thousands in use by Home Mechanics, Home Hobby Shops, Industries and Original Equipment Manufacturers.

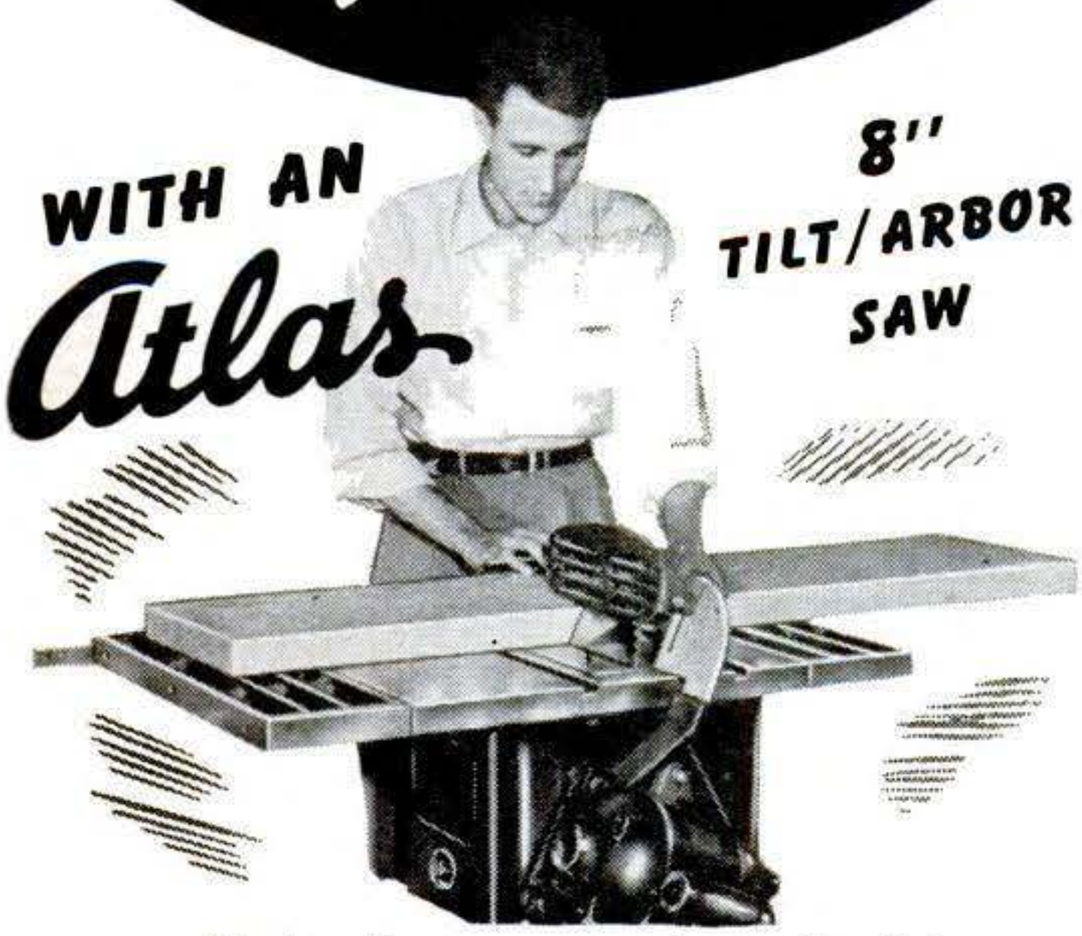
ORDER TODAY

YODER CLUTCH CORPORATION
ORRVILLE, OHIO

Copyrighted material

Start Saving Right Now!

WITH AN **Atlas** 8" TILT/ARBOR SAW



Make home repairs...build summer furniture, cabinets, cupboards, garages, tool houses

The day you put this Atlas saw to work in your shop or on the job you can start saving money. It helps you gain hours of time on every project. Saves tedious hand-sawing. Makes your shop hours really productive.

The Atlas will handle your big work, too. Its 22" x 18" *precision-ground* table has 10⅝" ahead of blade — table 22" x 35½" with low-cost extensions. Blade cuts 2⅜" deep — tilts 45°. Full length, quick-positioning rip fence. Vernier control for accuracy. Ball bearings for smooth dependability. See it at your Atlas dealers today, or send coupon.

FREE Catalog—Write

Please send your catalog on the 8" Tilt/Arbor Saw and ☐ other Atlas tools.

Name _____

Address _____

City, State _____

ATLAS PRESS CO.
555 N. Pitcher Street,
Kalamazoo, Michigan

Atlas — Atlas POWER KING

MATCHED PRECISION TOOLS FOR WOODWORKING AND METALWORKING

1-minute angle set-ups! Tilt it for the angle and lock it. You're set up for any operation, machine or bench. Two sizes, 2" and 2¾" jaws, with or without swivel base. Write for Vise Folder and "Yankee" Tool Book.

YANKEE TOOLS NOW PART OF STANLEY

THE TOOL BOX OF THE WORLD

NORTH BROS. MFG. CO.
Philadelphia 33, Pa.

WOOD CARVING

9" TALL FIGURINE Postpaid in U.S.A. **$1.85**

This beauty is easily carved in white pine with a mahogany and velvet base. Complete kit includes Material, Tru-Form templates and instructions. For more new and unusual projects send 10c for latest catalog.

BRAUN-CRAFT 1232 ETOWAH, DEPT. PS-18 ROYAL OAK, MICHIGAN

ELECTRIC SHEAR SHARPENER

Over 55,000 Sold—It Must Be Good!

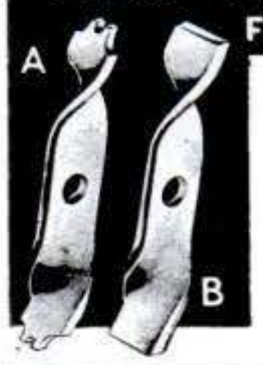
Genuine Carborundum wheel ideal for shop or home use. Send remittance with order and shipment will be made at once, prepaid to your door. complete with electrical goods catalogue.

Motor driven **$9.75** complete with vise

WILLIAM MARVY COMPANY, Dept. 7
479 St. Peter Street St. Paul 2, Minn.

USE YOUR BENCH SAW

FOR JOINTING & CUTTING MOULDINGS



With our six inch tool steel cutters make mouldings, casings, drop-leaf tables, grooves beading and jointing. Moulding cutters, A 1 in. wide $1.75, 1½ in. $2.25. Jointing cutters, B 1 in. $1.75. 1½ in. $2.25. E 1 in. for drop-leaf tables. $1.75. E 1½ in. Makes ¾ in. cove & Quarter. $2.25. Postpaid. Guaranteed. State size hole. List & Folder free.

JOHN A. SANDSTROM
Rt. 2-P. Clearwater, Fla.

MYSTERIOUS DEVICE WELDS BRAZES SOLDERS & CUTS

ANYONE CAN OPERATE

This newly invented FOUR-WAY PORTABLE ELECTRIC WELDER will do brazing, soldering, welding and cutting on brass, bronze, iron, steel, cast iron and other metals. It's easy to use. WORKS INSTANTLY off any properly wired 110 VOLT A.C. OR D.C. LINE. Does a thousand and one professional type repair jobs. SAVES TIME AND MONEY on auto, home appliance, farm and shop repairs. Ideal for maintenance men, farmers, repair shops, engineers, tin smiths, home and auto owners, bicycle and fix-it shops. **10 DAY TRIAL OFFER.** COMES COMPLETE WITH ALL SUPPLIES READY TO OPERATE including instructions. FULLY GUARANTEED. Order today for 10 DAY TRIAL or write for FREE particulars.

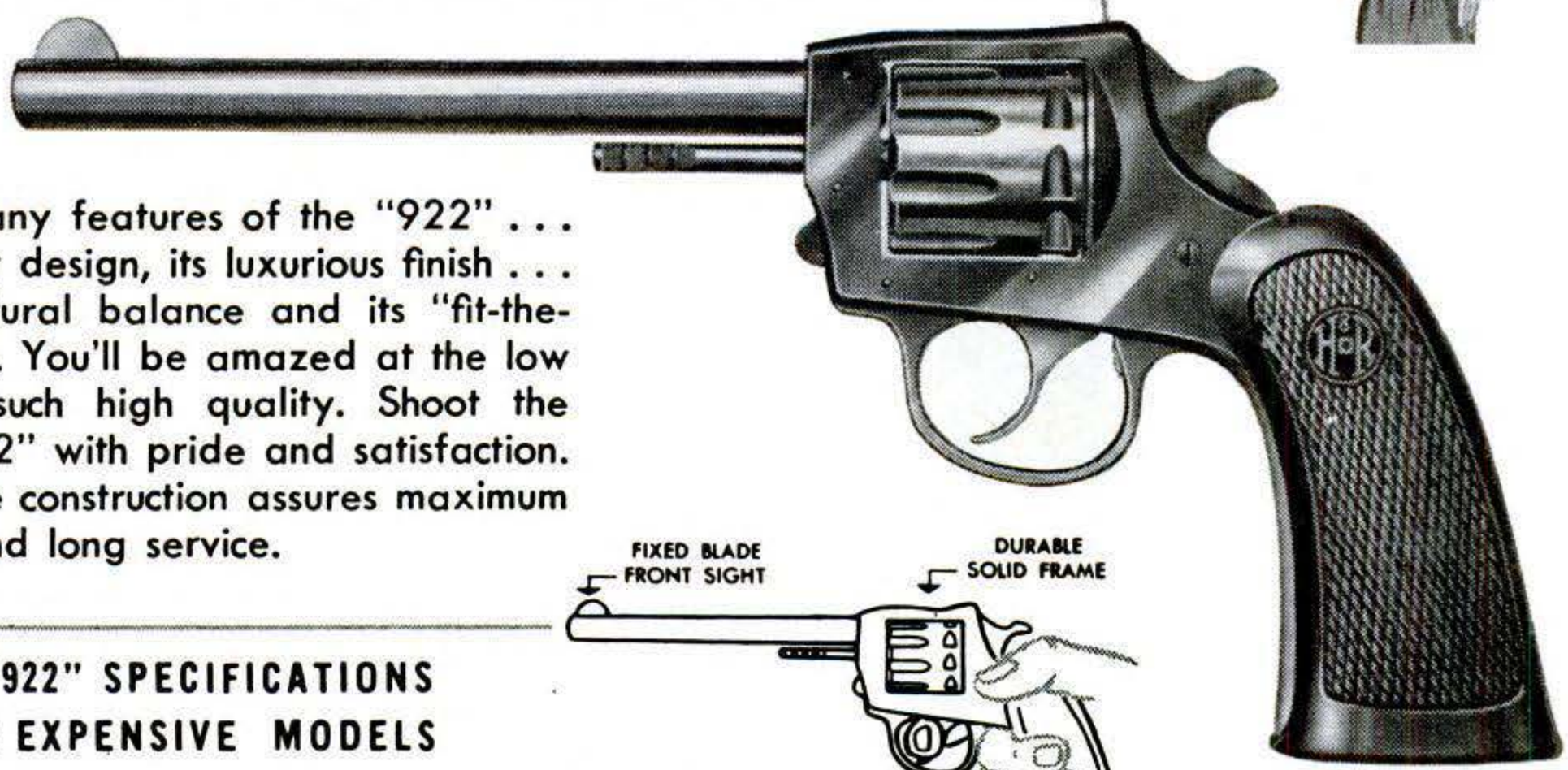
FOUR-WAY WELDER CO. Dept. PSDF-59
3180 North Clark St., Chicago 14, Illinois.

Copyrighted material

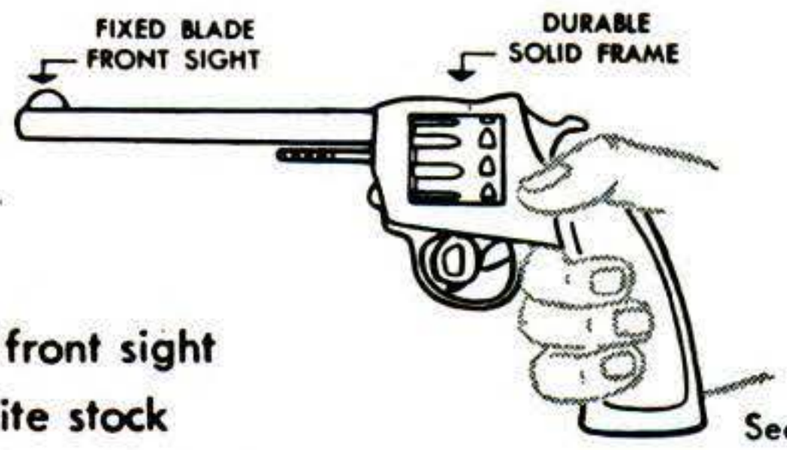
LOT of REVOLVER for LITTLE MONEY

"922"

Solid Frame .22 Caliber $24.75



See the many features of the "922" . . . its clean-cut design, its luxurious finish . . . *feel* its natural balance and its "fit-the-hand" grip. You'll be amazed at the low price for such high quality. Shoot the H & R "922" with pride and satisfaction. Solid frame construction assures maximum accuracy and long service.



COMPARE "922" SPECIFICATIONS WITH MORE EXPENSIVE MODELS

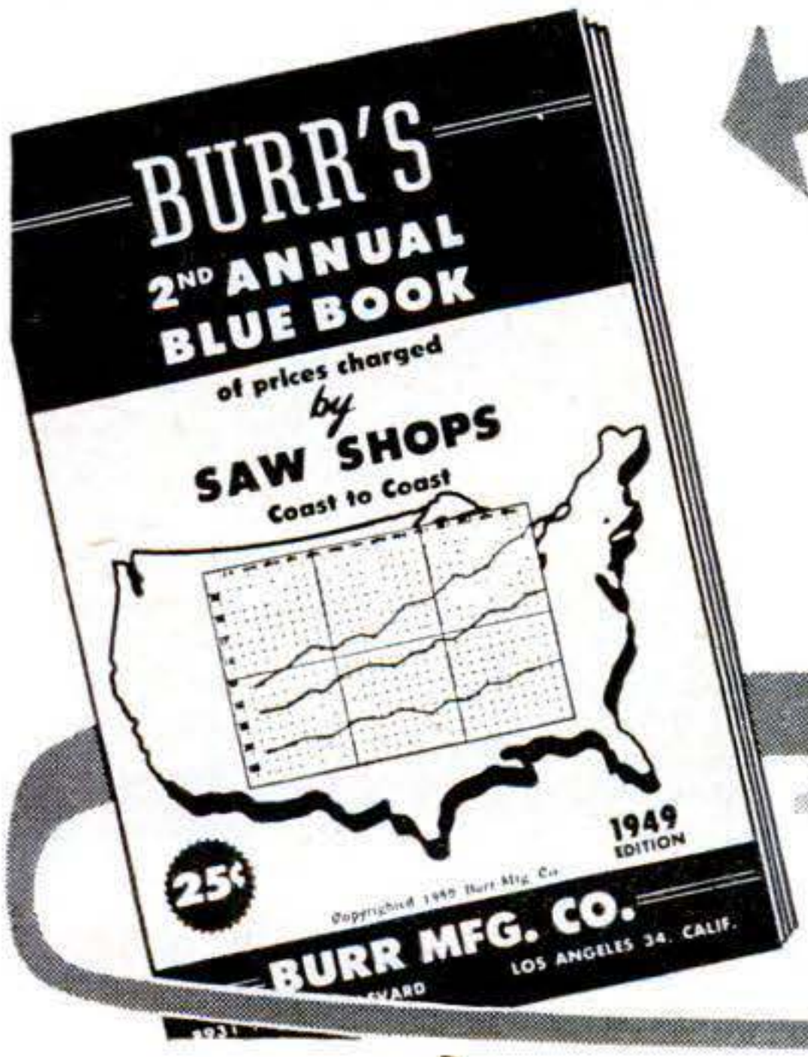
- 9-shot chamber
- 3 barrel lengths – – 6", 4", 2½"
- Crown-lustre blue finish
- Fixed blade front sight
- Checked Tenite stock
- Chambered for .22 short, long or long rifle

See the H & R "922" at your gun dealer's. It's a thrifty investment in long-time fun and service.

For FREE catalog on other fine H & R sporting arms — write

Harrington & Richardson Arms Co.

366 Park Avenue, Worcester 2, Mass.



HOW TO EARN MORE . . . . .
SHARPENING SAWS!

Get a fair price for your work! Use the Blue Book for saw shop prices . . . tells prices in 48 states. THIS VALUABLE BOOK. 25c
Leading saw shops earn more with fast, accurate machines. Write for free information on these profit makers today!
Automatic Retoother — cuts new teeth in 50 seconds.
Automatic Saw Set — sets 400 teeth per minute.
Circular Saw Sharpener — gums and iointes saws 5" to 5'

BURR MFG. CO.
8943-X VENICE BLVD. LOS ANGELES 34, CALIF

Copyrighted material

MOTORISTS WISE

SIMONIZ

T.M. REG U.S. PAT. OFF.

MAKES CARS STAY BEAUTIFUL

Simonizing saves you time as it saves the finish!

Don't waste your time with 'temporary polishings'! Simonizing gives long lasting beauty... protects the finish and keeps colors from fading. Do as millions of motorists...Simoniz your car. It's easy to do yourself.

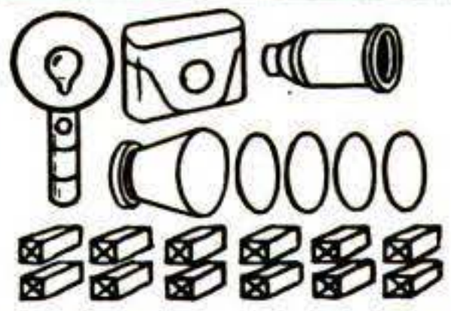
THE SIMONIZ COMPANY, CHICAGO 16, ILL.

Use Simoniz Kleener (liquid or paste) to clean finish. Then Simoniz for lasting beauty. Sold everywhere!

SAVE $8.91 ON MERCURY II OUTFIT

ALL THIS FOR ONLY $89.50

$8.95 Down* Balance Monthly



Yes! A regular $173.41 value for only $89.50! The General's New Money-Saving Outfit includes EVERYTHING you need for perfect results—at a Saving of almost ½ from the regularly advertised list price.

**MERCURY II	$ 82.90
**Flash gun	7.30
**Carrying Case	7.25
New Telephoto Lens	49.50
Sunshade and Filter Holder	4.50
4 Filters at $2.25	9.00
12 rolls Eastman or Ansco Reloads	12.96
Reg. Advertised Price	$173.41

Now! Only

$89.50—$8.95 Dn.

**Like new with 90-day service guarantee!

***BUY NOW-PAY LATER On The General's *"Pay-As-You-Shoot" Plan**

ORDER THIS EASY WAY

Mail your order, down payment (not less than 10%), short note about yourself and two references. In a few days your ready-to-use MERCURY II OUTFIT will be on its way to you.

10-DAY FREE TRIAL

Order your MERCURY II Outfit today and if within 10 days you are not satisfied, return for full cash refund.

The GENERAL Camera Company

Mail Order Division, Dept. PM, Chicago 45, Ill.

WRITE NOW FOR FREE CATALOG NO. SM4

THE foster LINE

POWER TOOLS

FOSTER MFG. CO., 247 DELAWARE AVE., BUFFALO 2, N. Y.

CARTWRIGHT'S

Patented

TRU-CUT TIN SNIPS

Easiest cutting tin snip. Handy tool for 1,001 jobs. Lightweight—will cut 18 gauge sheet metal. Very finest for cutting metal accurately to any simple or complex pattern.

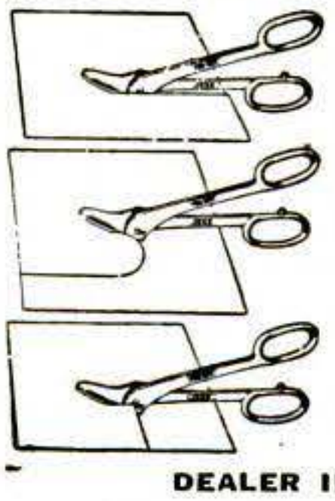
Prompt Delivery

$4.95 ea.

Post-paid on cash orders

Check These 7 Tru-Cut Features

1. Cuts a perfect circle, right or left. **2.** Cuts square points, both ways, right or left. **3.** Hands are always above material when cutting. **4.** TRU-CUT Snips are patented and protected by J. Cartwright & Son, in business since 1885. **5.** Tool is guaranteed against mechanical defects and will be replaced upon returning to factory. **6.** Special "Cup Tension Washer" designed and made for TRU-CUT retains a tight fit. **7. Faster** cutting, **Truer** cutting, **Easier** cutting, **Less** tiring, **Stay Sharp Longer** and will give **Years of Service.** Get this easy time-saving snip today. If dealer can't supply order direct from us. Send cash, check or money order, and we pay postage. SATISFACTION GUARANTEED. $1.00 deposit on C.O.D.'s.

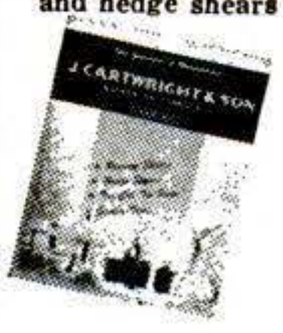


1. TRU-CUT fits the hand. Well balanced. Weighs only 2 lbs.

2. TRU-CUT will cut inside circle without wrinkling metal.

3. TRU-CUT cuts square points both ways on inside cuts.

Write for FREE CATALOG of complete line of pruning shears and hedge shears



DEALER INQUIRIES INVITED

J. CARTWRIGHT & SON

Malaga Dept. SP-5 California

Copyrighted material

TIME-SAVING TOOLS for SHOP and HOME

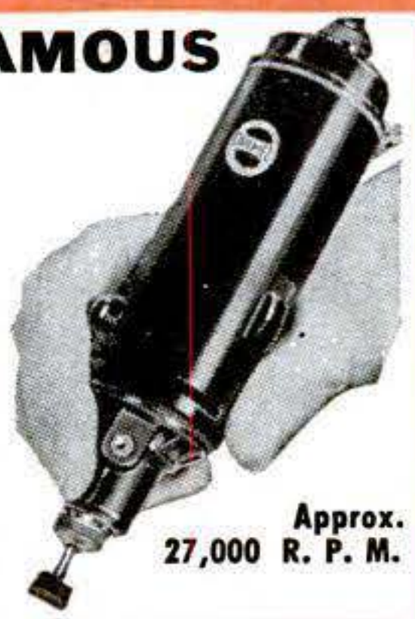
ELECTRIC DREMEL POWER TOOLS

OWN A FAMOUS MOTO-TOOL

The "Pocket-Size Machine Shop"

HIGH-SPEED STEEL CUTTERS —AT NO EXTRA COST

No shop or home is completely equipped without **MOTO-TOOL** . . . the **correctly balanced** motor-in-hand tool. It grinds, drills, carves, polishes—**without vibration.** 27,000 r.p.m. (approx.) does work better, faster, in wood, metal, glass, plastic. **MOTO-TOOL Kit No. 2** includes **high-speed steel cutters** for longer life. **MOTO-TOOL** is backed by over 12 years of industrial use . . . packs years of pleasure. Due to wide popularity and increased production, **Dremel's pre-war prices still prevail!**



Approx. 27,000 R. P. M.

MOTO-TOOL KIT NO. 2 with 23 accessories including **high-speed steel cutters** and Model 2 Moto-Tool in hardwood case **$23.50**
MOTO-TOOL NO. 2 with one emery point **$16.50**
MOTO-TOOL KIT NO. 1 with 34 accessories and Model 1 **Moto-Tool** in wood case **$17.50**
MODEL 1 MOTO-TOOL with one emery wheel point . . **$9.85**

NEW DRILL PRESS

This 12" high, precision drill press is ideal for model making, wood carving, routing, etc. Utilizes No. 2 **Moto-Tool. Only $9.95 (Less Moto-Tool).**

Look For These Moto-Tool Features

Dynamically balanced armature for vibrationless finger-tip control ● Oilless (oil-sealed) bearings ● Patented automatic chuck lock pin ● Over-size armature shaft—hardened, ground, polished ● 110 Volt AC-DC motor ● Snap-type sliding switch ● Cord protector ● Shockproof bakelite housing ● Dust-filtered air-cooling system ● Weighs only 13 oz.

"New MOTO-SANDER" AND POLISHER

Makes Fun of Hard Work

Patented

Only **$14.85** POSTPAID

SAY "GOOD-BYE" TO HAND SANDING & POLISHING!

Let speedy **"Moto-Sander"** do the work while **you** just guide it. Ideal for light sanding jobs. Use **Moto-Sander** for finishing, refinishing, redecorating. Quickly and smoothly sands furniture, walls, woodwork, wall board, plaster joints; boats, workshop projects, etc. **Straight-line action** (non-rotary) will not burn or scratch surface. Use **Moto-Sander** also for fast, effortless **polishing** of furniture, refrigerator cabinets, automobiles, other waxed surfaces. This versatile machine works on flat or curved surfaces—gets into tight corners. **Moto-Sander** is the lightest, most practical electric sander on the market. Delivers 7,200 strokes a minute . . . weighs only 2½ lbs. Furnished complete with 6 sheets assorted grade Garnet Paper for sanding, plus **felt pad** and **sheepskin** for wax polishing. Operates on 110-120 V., 60 cycle A. C. Thousands of satisfied users.

GREAT FOR AUTO POLISHING

GETS INTO TIGHT CORNERS

MOTO-SAW

AN *Electric* SCROLL SAW

SAFER THAN A HAND SAW

A high-speed power saw for boys from 8 to 80! **Moto-Saw's** 7,200 strokes a minute easily cuts intricate scroll designs—no limit to length of cut—averages 1 foot per minute through medium hardwood up to ¾" thick. **Four-way blade holder** permits sawing in any direction . . . at any angle. **Moto-Saw** has only 2 moving parts—never needs oiling. Operates on 110-120 V., 60 cycle A.C. Thousands of satisfied users.

ONLY **$5.85** POSTPAID

(With 3 Blades)

JUST GUIDE IT!

The versatile **Moto-Saw** is as safe as a hand saw. A touch of the trigger switch sets it going . . . releasing stops it instantly.

WHERE TO BUY

Dremel products are sold everywhere. See these popular time-saving tools at your local dealer's. If he is unable to supply you, order direct from factory.

5 DAY TRIAL—MONEY-BACK GUARANTEE

We will ship postpaid if you send cash with order (use check, draft or money order), or send only **$2.00** now, and pay postman balance plus postage. Try the tools for 5 days. Money back if not delighted.

DREMEL MFG. CO.

Dept. 129-E Racine, Wis.

LUMINOUS PAINT GLOWS IN THE DARK!

NOW you can paint any article or part of an article **Brilliant Green, Misty Violet, Bright Blue, Radiant Orange, Blue-Green, Golden Yellow and Orchid.** Beautiful, standard colors by day that glow brilliantly at night! Thousands of uses! Liberal size can any color sent postpaid for only 89c. FREE illustrated catalog. LUMINOUS SAMPLE DISPLAY cards show how RADI-GLOW paints can be used.

CHEMICAL PRODUCTS COMPANY
1412 Great Northern Bldg., Dept. 302, Chicago 4, Ill.

89¢ PER CAN

SEND FOR FREE CATALOG!

D.C. ARC WELDER

200 AMPERES CONTINUOUS DUTY ONLY **$97.50**

Easily mounted on tractor or elsewhere. Welding range 0-250 amperes by dial type control. Price includes proper pulley for your application. 12 months guarantee, with money-back 10-day trial period. (A $300 value). Write today for free literature or catalog.

Or, send . . . . . **35c** for PLAN "Build Your Own Welder from Surplus Aircraft Generator" and we'll include literature and catalog.

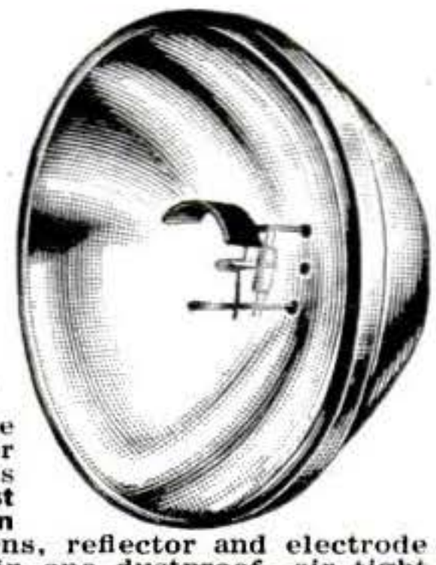
LEJAY MFG. CO.
823 LeJay Bldg., Minneapolis 8, Minn.

Copyrighted material

GROBAN'S—WAR SURPLUS BARGAINS

SHOP BY MAIL and SAVE
Better buys · Satisfaction guaranteed

BRAND NEW
GENERAL ELECTRIC 8" Sealed Beam FLOODLIGHTS



300 Watts, 110 Volts, A.C.-D.C.

Has countless uses for:
- **Homes**
- **Garages**
- **Workshops**
- **Driveways**
- **Outdoor advertising**
- **Displays**
- **Beach lighting**
- **Private air ports**
- **Photography**

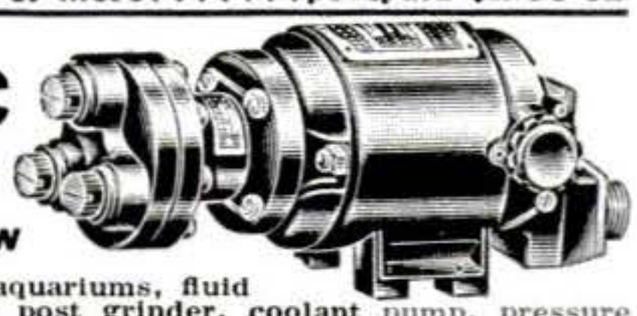
Wherever you need flood-lighting!

Bought by the U. S. Army for signal use. This is the **greatest surplus bargain** ever offered. Lens, reflector and electrode vacuum sealed in one dustproof, air tight unit. 300 Watts, 110 Volts. Weighs only 2½ lbs. List price $10.50.

A Tremendous Value for $2.75 ea. postpaid

12 or more . . . . . postpaid $2.50 ea.

SELF-PRIMING
ELECTRIC PUMP



COMPACT—BRAND NEW

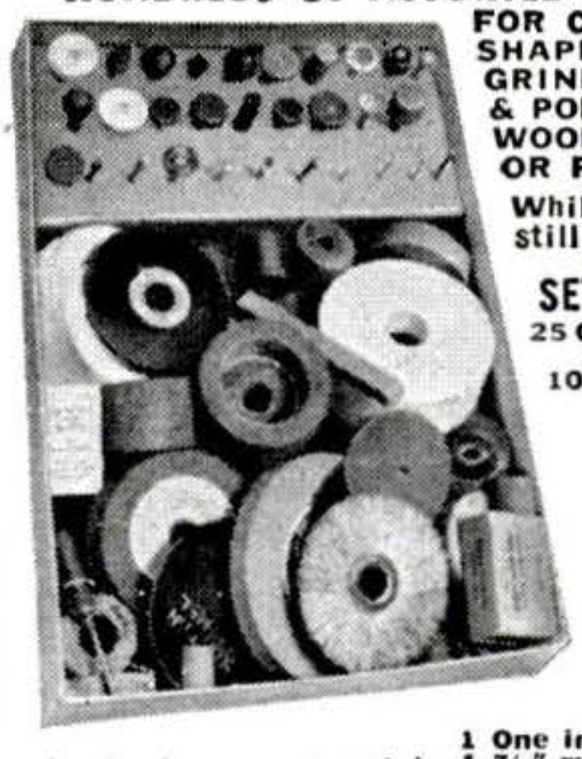
Applications: oil burners, aquariums, fluid metering, fuel pump, tool post grinder, coolant pump, pressure lubricating pump, general industrial, etc. **Motor mfd. by Black & Decker;** double ball bearing series wound, continuous duty, 1/30 H.P. electric motor, rated 12,000 R.P.M. Transformer included for use on 110 V AC current. Also applicable for 24-32 V DC. **Pump mfd. by Weldon Tool Co.** with standard ¼" tubing ports; rated 2 G.P.H.; remove pump and use motor as high speed grinder. **Overall dimensions:** 7¾" long x 3¼" wide x 3¼" high. Approx. wt. 5 lbs. $51.00 value . . . . . .

$12.95 Postpaid

Outstanding Surplus Value!

BRAND NEW—GUARANTEED
GRINDING WHEEL KITS

HUNDREDS OF ASSORTED ITEMS—A $50 VALUE



FOR CUTTING, SHAPING, GRINDING, & POLISHING WOOD, METAL OR PLASTIC.

While supply still lasts, only $8.95 Per Complete Kit F.O.B. Chicago

SET INCLUDES OVER 300 ITEMS
- 25 Grinding and cut-off wheels, sizes 1 to 5 inches, ⅛ to ¾ hole
- 10 Mounted stones—3/32", ⅛", ¼"
- 3 Steel cutters ⅛"
- 5 Steel cutters 3/32"
- 1 Steel circular saw mounted on mandrel
- 1 Drum sander ½" mounted on 3/32" mandrel
- 6 Cut-off Wheels on ⅛" m'ndr'l
- 1 One inch buff on ⅛" mandrel
- 2 leather wheels
- 1 Roughing stone
- 3 Honing stones
- 2 Felt bobs
- 10 Sanding rolls
- 6 Sanding sleeves
- 1 One inch felt wheel on ⅛" mandrel
- 1 ⅞" rubber wheel on ⅛" mandrel
- 2 High speed rotary files ¼" shank
- 100 ¾" cloth butterfly abrasive discs
- 1 One inch wire wheel ⅝" hole, brass center
- 1 4" wire brush
- 1 Box paper discs—100
- 1 Bristle brush 3", ⅝" hole, brass center
- 1 Rag wheel—4 inch

In sturdy compact container 13¼ x 9¼ x 2½", weight 8½ pounds; with installed rack for all drills.

I enclose $8.95 ☐ Check ☐ M. O. ☐ Send C.O.D.

Name _____

Address _____

MINIATURE High Speed
ELECTRIC MOTOR

Brand New

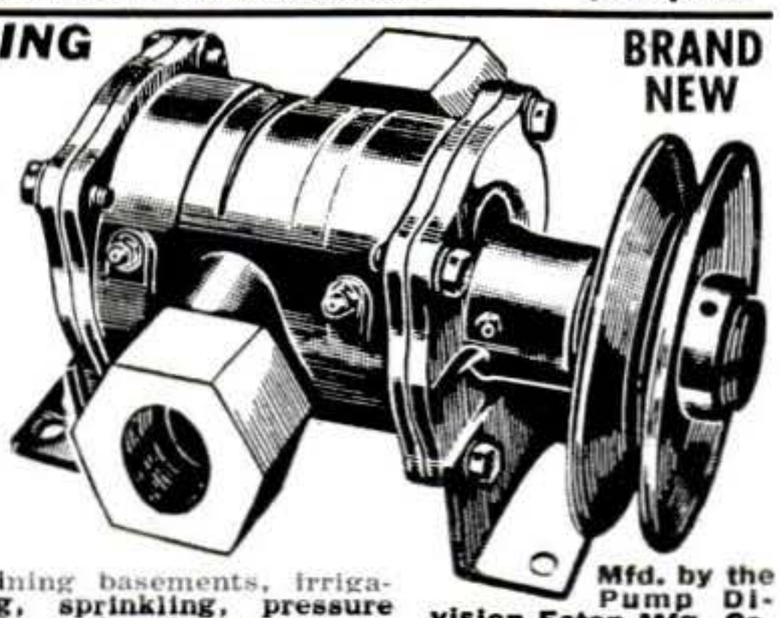
IDEAL FOR MODEL BUILDERS, MODEL RAILROADERS, EXPERIMENTERS, HOBBYISTS.

AC or DC. Reversible, speed may be regulated by varying voltage. Has miniature Klixon thermostatic switch. All connections are external and accessible. Has 3 mounting feet for easy installation. Double-end ball bearing supported shaft with small gear on one end. Die-cast housing with laminated field. Overall Dimen.: 3¼" long x 2⅜" wide x 1⅜" high. Net wt. 12 oz. A $22.00 value.

$2.95 postpaid

SELF-PRIMING
BRONZE PUMP

BRAND NEW



Positive Pumping Pressure

Mfd. by the Pump Division Eaton Mfg. Co.

Perfect for draining basements, irrigation, fire fighting, sprinkling, pressure booster, insecticide and other spraying, fuel transfer, stock watering, industrial pumping, deep well jet pumping and home water systems. Rated 25 ft. suction and 150 ft. head pressure at 80 gallons. Use from ⅓ to 5 H.P. motor.

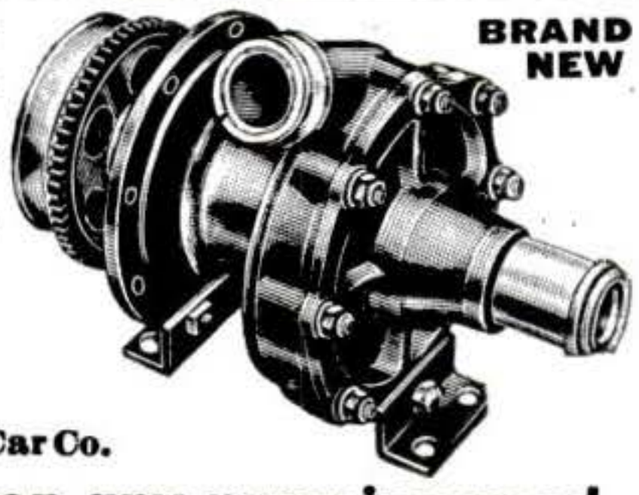
COMPLETE ENGINEERING REPORT AND INSTRUCTIONS FREE WITH PUMP

Supplied with mounting brackets and 5" V belt pulley, ready for instant use. Standard 1½" pipe thread inlet and outlet. Dimensions: 9½" x 7¼" x 4¼". Ship. wt. 18 lbs. A $142.00 value . . . . . .

$32.50 F.O.B. Chicago

ALL-PURPOSE WATER PUMP

BRAND NEW



Mfd. by Packard Motor Car Co.

Ready for use on any pumping need

Belt Driven Centrifugal Pump

Use it for:
- DRAINING BASEMENTS
- HOME WATER SYSTEMS
- FIRE PROTECTION
- PRESSURE BOOSTER
- IRRIGATION
- DRAINING PONDS, TANKS, etc.
- SPRINKLING SYSTEMS
- STOCK WATERING
- INDUSTRIAL PUMPING

Complete with pulley and mounting brackets, ready for use.

An extraordinary value for all types of intermittent or continuous pumping in the home . . . farm . . . factory. Built to exact specifications of Packard Motor Car Co. for use in Rolls-Royce Merlin Aircraft Engines. May be run with electric motor, gas engine or power take-off on tractor. Delivers up to 25 gallons a minute with ¼ H.P. motor; 80 gal. a min. with one H.P. motor. Will deliver up to 44 ft. head or 25 ft. suction. Use 1" outlet hose; 1" or 1½" inlet hose (recommended).

Complete Engineering Reports and Operating Instructions Free with Pump

Has cast aluminum housing, accurately machined 5" bronze impeller; 3½" V belt pulley and mounting brackets. Shaft rotates on ball bearing; has grease gun fitting.

Original cost approx. $88.00. Shipping weight 10 lbs. A REAL BUY.

$21.50 F.O.B. Chicago

WRITE FOR OUR FREE CATALOG!

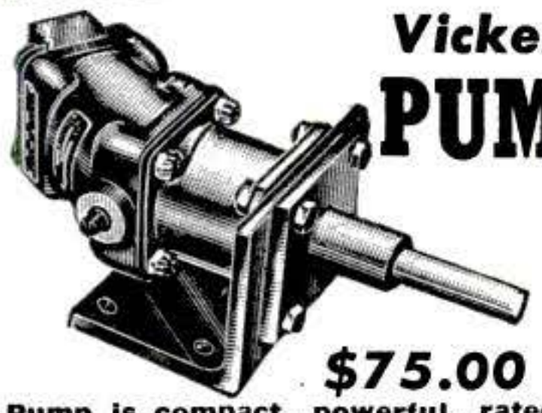
ORDER DIRECT FROM AD
Send payment or purchase order today
SATISFACTION GUARANTEED

GROBAN SUPPLY CO.
1507 SOUTH MICHIGAN AVE.
Chicago 5, Ill. Dept. PS-5

Copyrighted material

GROBAN'S—WAR SURPLUS BARGAINS

SHOP BY MAIL and SAVE
Better buys · Satisfaction guaranteed



Vickers MF9 Hydraulic

PUMP or MOTOR

complete with mounting kit ready to install

$75.00 value **$19.90** postpaid

Pump is compact, powerful, rated 1,000 P.S.I., .507 cu. in. per revolution. 8 gal. per min. at 3750 RPM. Change rotation by reversing flow. Delivers up to 6 H.P. Requires 1/3 to 6 H.P. to drive directly or by pulley. BRAND NEW.

Mounting kit has been especially designed to provide maximum utility and ease of mounting MF Series Vickers Pumps. Brackets are constructed of heavy steel plate; shaft is made of 1/2" steel with one end splined to fit pump; other end of shaft has machined flat for mounting a standard pulley with 1/2" hole. Shaft runs in oilite bronze bearings.

Pump only .....$14.95 postpaid
Mounting kit only.....$ 4.95 postpaid
Both as complete unit.....$19.90 postpaid

GENERAL ELECTRIC

DC GENERATOR

BRAND NEW For Farm—Home—Factory Welding—Light Plants

Delivers 30 volts, 267 amps. at 4000 RPM. Rated 8 Kilowatts, ball-bearing supported. Fan cooled armature. Drive it off of farm tractor, gas engine of 10 H.P. or more. Ship. wt. 65 lbs. U.S. Government acquisition cost—$277.00 Now Only **$28.50** F.O.B. Chicago

ADJUSTABLE RELIEF VALVE.....$2.95 postpaid

HAND HYDRAULIC PUMP

Brand New

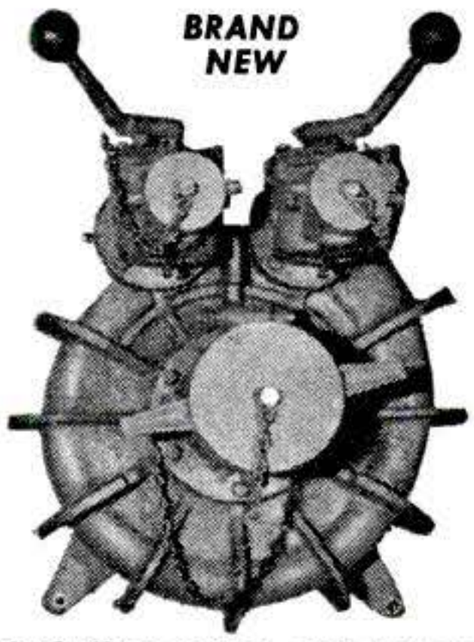
Used for hydraulic jacks, presses, hoists and other hydraulic applications. For operating hydraulic cylinders to pump oil or hydraulic fluid under pressure.

Hand pump has built-in check valve and is capable of delivering 1000 lbs. of pressure. Has alloy aluminum housing. Dimen.: 8" long x 3½" high x 2¾" wide. Ship. wt. 3 lbs. A $45.00 value.....Now **$8.95** postpaid

FREE: New, 20-page illustrated Hydraulic Manual featuring diagrams, photographs and instructions—FREE with each hydraulic order.

HALE FIRE and IRRIGATION

BRAND NEW



HIGH VOLUME

CENTRIFUGAL PUMP

For Fire Protection, Irrigation, De-Watering, Industrial Uses, Farm Uses, etc.

PUMPS RATED 500 GALLONS PER MINUTE AT 275 FT. HEAD PRESSURE.

Equipped with 1½" diameter straight splined shaft for direct coupling drive; 4½" threaded suction intake; two—2½" threaded discharge outlets; Hale Pump Co. Model CF volute type. Use any 4 or 6 cylinder gas engine or couple directly to front of truck or auto; or use 25 H.P. electric motor. Dimensions: 21" x 24" x 28". Complete with full accessory kit including suction and pressure gauges, priming equipment, and instruction book. Shipping wt. 415 lbs.....

Gov't. acquisition cost $425.00 NOW **$149.50** F.O.B. Chicago

BRAND NEW AIR OR OIL

HYDRAULICS

Use hydraulics on arbor presses, hydraulic presses, hay lifts, manure loaders, lift trucks—push or pull, tilt or turn, press or squeeze, open or close, lift or lower—and other hydraulic and industrial applications. Use with either air or oil . . . of finest precision workmanship.

1. Double action, 1" bore, 3" stroke, will lift 770 lbs. in 1/10 of a second using MF Pump. All steel barrel. Ideal for controls, door openers, positioning, etc. An $18.00 value..postpaid **$4.95**

2. Double action, 1½" bore, 5" stroke, will lift 1760 lbs. in one second with Vickers MF9 Pump. Wt. 3 lbs. A $35.00 value.....postpaid **$8.95**

3. Double action, 1½" bore, 9" stroke, will lift 1760 lbs. in one second with Vickers MF9 Pump. Wt. 4 lbs. A $45.00 value.....postpaid **$10.95**

4. Use these cylinders on farm trucks, bulldozers, hay lifts, manure loaders, etc. Double action, 1½" bore, 27" stroke. (Will lift 1760 lbs. in 2 seconds with Vickers Pump.) Wt. 8 lbs. A $55 hydraulic cylinder value for only .....postpaid **$12.95**

5. Double action, 2⅜" bore, 8" stroke. (Will lift 4400 lbs. in one second with Vickers Pump.) Will withstand 1500 P.S.I. against wall. Wt. 7 lbs. A $65.00 value.....postpaid **$14.50**

6. Double action 2⅜" bore, 5" stroke, two-way solid ⅝" alloy steel shaft (will lift 4400 lbs. in one second with Vickers Pump). A $73.00 value.....postpaid **$16.50**

7. Double action, 3" bore, 8½" stroke. All steel hydraulic cylinder, will lift up to 12,000 lbs. (7000 lbs. in 3 seconds with Vickers Pump.) Complete with fittings. Wt. 12 lbs. A $78.00 value.....postpaid **$19.50**

8. **Double action, 3½" bore, 11" stroke.** (Will lift 9600 lbs. in 7 seconds using Vickers MF9 Pump.) Complete with fittings. Wt. 15 lbs. A $92.00 value.....postpaid **$22.50**

9. Double action, 3" bore, 23" stroke, hydraulic cylinder will lift 7070 lbs. in 5½ seconds using MF9 Hydraulic Pump. Especially suited for farm and construction machinery. Clevis mounting for easy use. Wt. 22 lbs. A $145.00 value. F.O.B. Chicago **$27.50**

Fittings available for above cylinders

Hydraulic Control Valves

Brand New

1. Four-way control valve for use with double action hydraulic cylinder, may be used with 1500 P.S.I. hydraulic system to open and close hydraulic cylinders. Brand new. Ship. wt. 4 lbs. A $38.00 value .....postpaid **$7.95**

2. Four-way control valve for use with two hydraulic double action cylinders. Each cylinder may be operated independently of the other or in conjunction with the other. Oil may be locked in any of the cylinders to hold the piston at any required position. Brand New. Ship. Wt. 6 lbs. A $60.00 Value, postpaid **$10.95**

3. A two cylinder double action valve with a unique arrangement, allowing the operator to raise both cylinders simultaneously, to lower them simultaneously or to raise one and lower the other at any predetermined rate and speed. Brand New. Ship. Wt. 8 lbs. A $75.00 value postpaid **$14.95**

Brand New Double-Action Pneumatic-Hydraulic

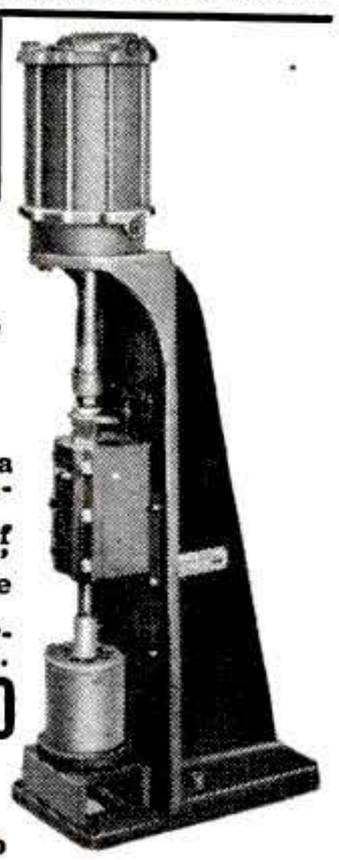
PRESS

$300.00 value offered at a fraction of original cost

Using air or oil, this device is ideal as a punch press, vise, arbor press, etc. An excellent tool for industrial and shop use.

Use 150 lbs. of air pressure or 250 lbs. of oil pressure. Cushioned double action "Logan" Model AC ram, 6" bore and 6" stroke. Capable of up to 4200 lbs. of pressure using air.

Has 3" throat. Lubricated gibs provide perfect alignment. Has adjustable work space. Hardened alloy steel piston rod 1" diameter. Frame constructed of cast steel with ¾" base plate. Manufactured by Sipp-Eastwood Co. Unit is 49" high. Base is 9½" wide by 18" deep. Wt. approx. 300 lbs. AN OUTSTANDING BUY at..... **$79.50** F.O.B. Chicago



WRITE FOR OUR FREE CATALOG!

ORDER DIRECT FROM AD
Send payment or purchase order today
SATISFACTION GUARANTEED

GROBAN SUPPLY CO.
1507 SOUTH MICHIGAN AVE.
Chicago 5, Ill. Dept. PS-5

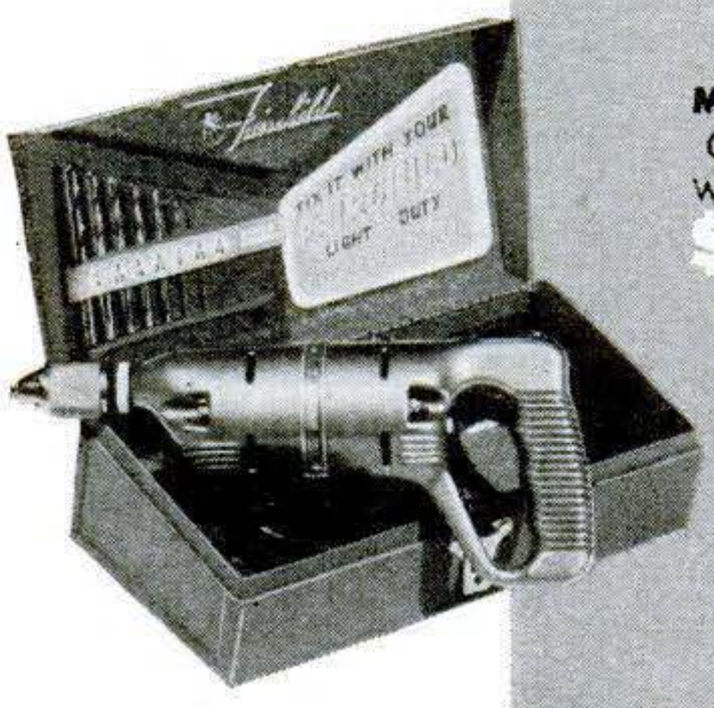
Copyrighted material

NO BETTER COMBINATION OF PERFORMANCE AND PRICE

MODEL F-149
$15.95

FAIRCHILD
1/4" DRILL

With power to spare for a thousand jobs of repair and construction around home and work bench, here is an all-purpose Drill designed for usefulness, service and value. It's the famous Fairchild Drill with the perfect "feel" of saw-grip handle and dynamic balance. Motor turns up 1200 r.p.m. and develops 1-12th horsepower at the chuck. Jacobs chuck available at slight additional cost.



MODEL F149-K
Complete Kit
With 7 Twist Drills
$19.95

See it at your dealer's

FAIRCHILD INDUSTRIES, INC.
BURLINGTON VERMONT

A TOOLSHOP IN YOUR HAND

THERE'S ONLY ONE GENUINE HANDEE

First tool of its kind—today's finest. Smooth, steady power at your fingertips. Easy to handle. Make ship, plane and train models, bookends, costume jewelry. Grinds, drills, polishes, routs, carves, sands, saws, engraves on metal, wood, plastic, glass, leather, etc. 25,000 r.p.m. AC or DC. Wt. 12 oz. With 7 accessories $20.50. In case with 40 accessories $27.50. At stores or sent postpaid. A fine gift for a friend or yourself. CHICAGO WHEEL & MFG. CO., 1101 W. Monroe St., Dept. PO, Chicago 7, Ill. Free 52-page manual.

HANDEE TOOL OF 1001 USES

An Outstanding METAL HAND PUNCH
with unusual performance

• • •

Needed by every Mechanic in every Shop . . . . . .

No. 5 Jr. HAND PUNCH
CAPACITY—1/4" THRU 16 Ga. Mild Steel. 3/32" — 1/8" — 5/32" — 3/16" — 7/32" — 1/4" — 9/32" — Punches and Dies Furnished.

THROAT DEPTH 2 inches

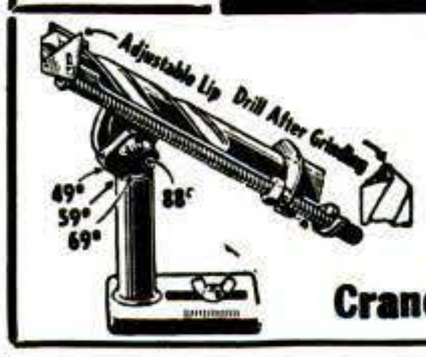
Weighs 2¾ lbs.

only $8.75 Postpaid in U.S.A.

ORDER YOURS TODAY!
Write for FREE Catalog on other tools.
WHITNEY METAL TOOL CO., Dept. P-3, Rockford, Ill.

NONE BETTER!

SUPER DRILL GRINDER



Sharpens round shank drills from 3/32" to ½" in diameter, up to 6" long. Grinds old drills like new in 4 different point angles, using hand or power grinding wheels. Money-back guarantee.

Price only $2.95
At Dealers or Postpaid
Crandall Mfg. Co. 1512 W. Slauson, Dept. FB-41, Los Angeles 44, Calif.

FREE! SOUTH BEND CATALOGS

Cat. 100—9" to 16" SWING LATHES
Cat. 400—14" DRILL PRESSES
Cat. 500—7" BENCH SHAPER
Cat. 77—ATTACHMENTS
Write today—state catalog wanted

SOUTH BEND LATHE WORKS
456H E. Madison St., South Bend 22, Ind.

STANDARD GARDEN AND SMALL FARM TRACTORS

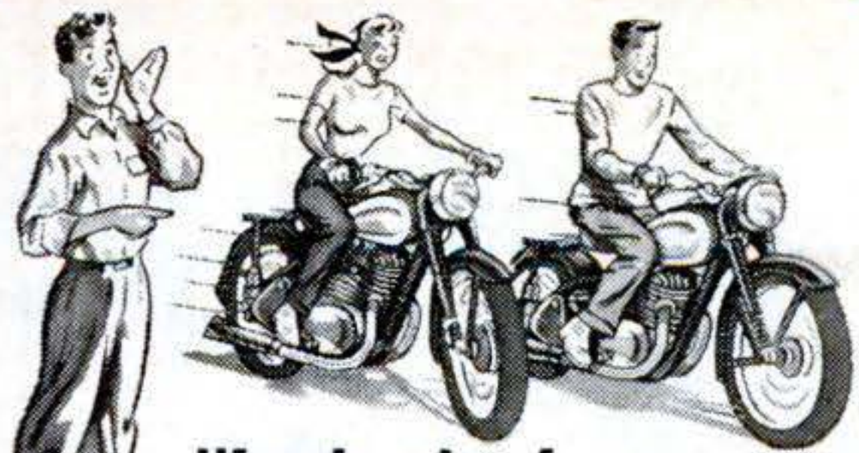
Plow
Seed
Cultivate
Mow Hay
and Lawns

Powerful Gas Tractors for Small Farms, Gardeners, Florists, Nurseries, Fruit Growers, Poultrymen.

1 & 2 Cylinders
High Wheels. Rubber or Steel Tires. Walk or Ride.
Do Belt Work — *Free Catalog*

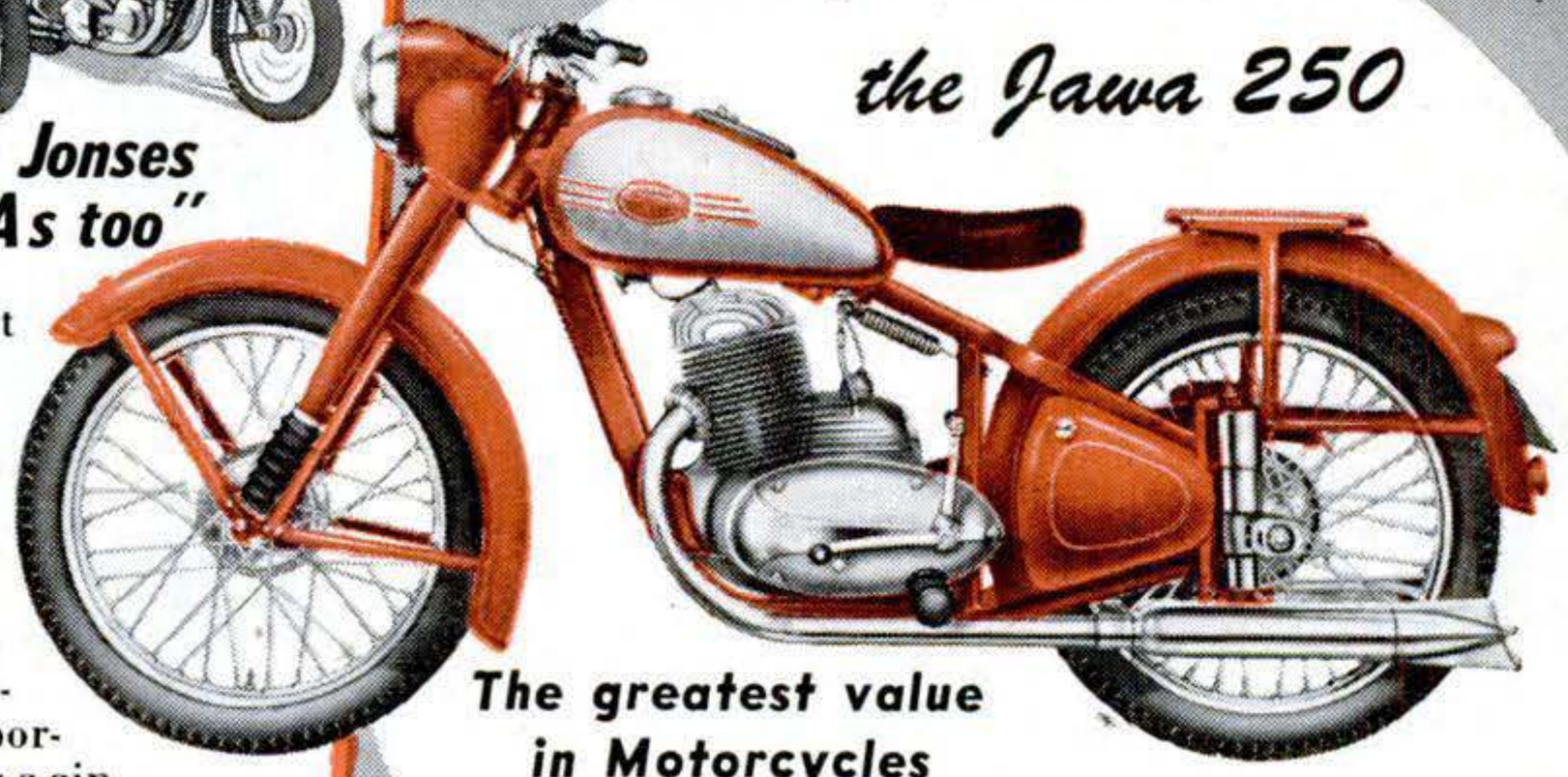
STANDARD ENGINE CO.
MINNEAPOLIS, MINN. 4041 Como Avenue
NEW YORK, N. Y. 681 West 26th Street

Copyrighted material



the most talked about motorcycle in America

the Jawa 250



"Look, the Jonses have JAWAs too"

From coast to coast Jawa owners are telling us of the pleasure and service they are enjoying. Yes, the Jawa is a new kind of motorcycle . . . designed for comfortable, sensible transportation with all the z-z-zip of a jet.

See your Jawa dealer today and try it out yourself. You'll agree, too, "it's a honey of a motorcycle".

Franchise Dealerships available. Write today for details.

JAWA

The greatest value in Motorcycles

• No jounce or jar on any road • Soft Braking • Front & rear Tele-Float Spring Suspension • Automatic Clutching • Four-Speed foot gear shift • Constant mesh transmission • 95 miles per gallon. More exciting features in a Jawa than in any other motorcycle . . . at a price that makes it your OUTSTANDING motorcycle buy!

At your Jawa Dealer or write to

JAWA MOTORCYCLE CO.

DIVISION OF INDUSTRIAL OPERATIONS, INC.

2432 Grand Concourse, New York 57, N. Y.

Hydraulic SPEED REDUCER OF MANY USES

Variable Speeds and INSTANT REVERSE

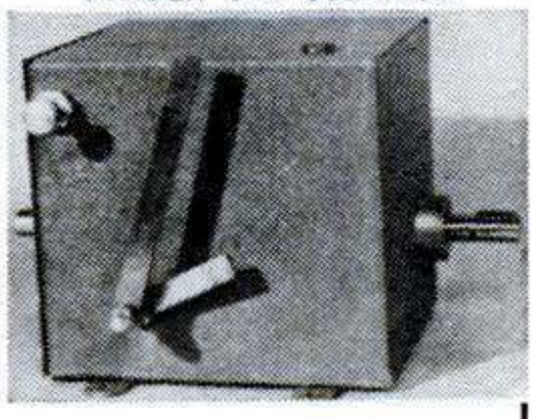
Zero to 600 or 700 R.P.M.

For LATHES, REAMERS, TRANSMISSION, MIDGET CARS, MILLING MACHINE TABLE, SHAPER, THREAD MILLING FIXTURES, HOME MADE WOOD WORKING LATHE, EXHAUST FAN, PUMP, HOIST, GENERATOR, OVERHEAD TROLLEY, PRODUCTION BELT, OPENING and CLOSING DOORS, and MANY OTHER USES. Industrial or Home Use. Cost Government $300.00. High Quality Precision Workmanship. Case measures 7½" Long, 7" High, 6½" Wide. Input and Output Shafts ⅝" diameter. Beautiful Red Crackle Finish Case.

If C.O.D. is requested a 10% Deposit must accompany order and we ship F.O.B. Chicago.

Output Torque Adjustment Zero to 100 Inch Pounds

FINGER TIP CONTROL



Shipping Wght. 25 pounds.

Only **$54.50**

Prepaid 2 quarts oil included FREE

1½"—8 thread Lathe Chuck Adapter $3 ext.

DIRZIUS MACHINE SHOP "C." 1423-25 So. 52nd Ave., Cicero 50, Ill.

AMES

UNIVERSAL DIAL INDICATOR SETS

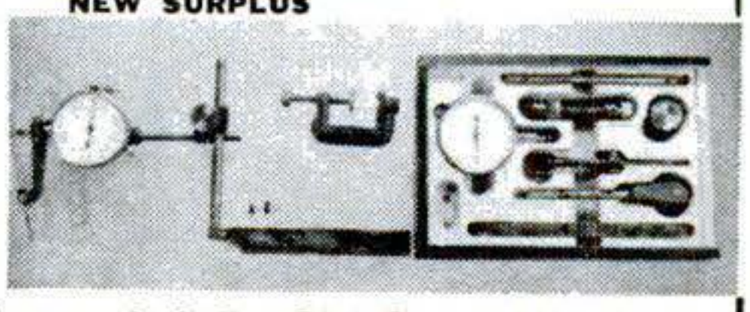
NEW SURPLUS

OUR PRICE

$15.00

Reg. sold for

$23.00



You get a complete set including Dial Gage with hole Attachment, Bar with Upright, Clamp sliding swivel, Dial holding rod and three contact points. Hole attachment also, can be adjusted to almost any position, and used in places inaccessible to ordinary indicators. All this along with a beautiful box for only $15.00.

Write today before limited supply of these AMES KITS are exhausted.

183 Grand Street SID TOOL CO. New York, N. Y.

MAKE ANY CUT WITH THESE NEW WOODSHAPERS for YOUR CIRCLE SAW or DRILL PRESS!

MODEL #60—Originally designed for heavy industrial use, now priced for home workshop. Can be attached directly in chuck of your drill press. Exclusive pilot bearing (see illustration) eliminates side thrust, chatter and vibration—assures smooth cutting action. Blades can't come out—set screws hold them securely. Complete, with YOUR CHOICE OF ANY 6 PAIR DOUBLE-GROUND BLADES SHOWN BELOW, only $12.95.

MODEL #50—Same as Model #60 but without exclusive pilot bearing. Designed for intermittent shaping: over 100 different shapes can be cut. Complete, with ANY 6 BLADES OF YOUR CHOICE SHOWN BELOW, only $8.95.

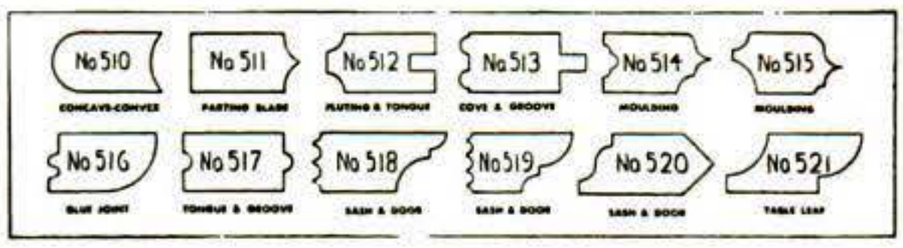
All Aladdin tools are **guaranteed.** Postage prepaid with all cash orders. C. O. D. plus postage. GET YOUR ORDER IN TODAY.

For Your Circle Saw

MODEL SA-10—Heavy-duty, industrial-type shaper of solid steel, now priced in home workshop range. Absolutely safe — blades locked in position with screws all the way through. In ordering, state diameter of shaft. Complete WITH ANY 6 PAIR OF READY-GROUND BLADES SHOWN BELOW, only $14.95.

ALADDIN WOODSHAPING BLADES

Specify by number the blades you want. Additional blades $1.50 each, $3.00 per set.



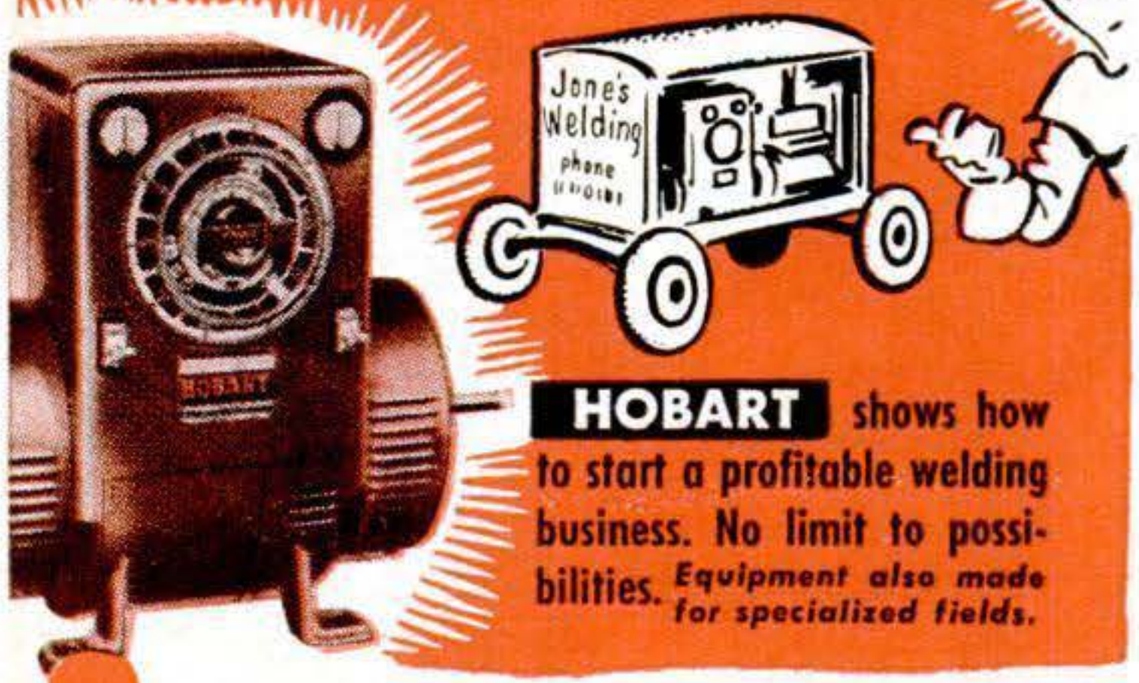
ALADDIN TOOL COMPANY

3121 Main Street Kansas City, Missouri

Dealers Write Today

Copyrighted material

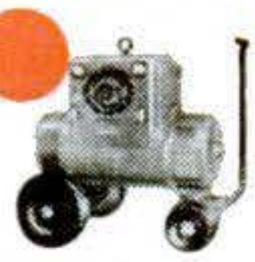
SAVE $300.00 TO $500.00 ..."BUILD YOUR OWN" ARC WELDER!



HOBART shows how to start a profitable welding business. No limit to possibilities. *Equipment also made for specialized fields.*

HOBART Welding Generator (for building your own) Complete in every way except for motor, this full capacity generator can be used to build portable gas engine driven welder, or can be operated with electric motor, or belt driven from power shaft.

Gas Engine Driven D. C. Welder for repair and construction in field.



Electric Driven D.C. Welder for speedy production and maintenance work.

Transformer Type A. C. Welders. Sizes 180 to 500 amp. for most all shops.

A.C. Generator Only "Build Your Own" power plant to do welding or operate lights, tools, etc.

AC Weld—AC Power Complete gas engine driven A. C. Welding and A. C. power anywhere.

DC Weld—DC Power Gas engine driven. Ideal for field work. Weld, operate tools, hoists.

LEARN WELDING QUICKLY AT THE HOBART SCHOOL—

It's easy and cost is small. Latest methods and equipment for all types of welding. Qualified under G. I. Bill.

HOBART Brothers Co., Box P-59, Troy, Ohio

"One of the world's largest builders of arc welders"

clip coupon and mail today!

Hobart Brothers Company, Box P-59, Troy, Ohio
Check the items on which you want more data and receive free copy of "Guide to Better Welding."
capacity _____ amperes

- ☐ D. C. Generator to "Build Your Own"
- ☐ Gas Engine Driven D. C. Welder
- ☐ Electric Driven D. C. Welder
- ☐ A. C. Transformer Welders
- ☐ A. C. Generator to "Build Your Own"
- ☐ Gas Driven A. C. Welder, Power Unit
- ☐ Gas Driven D. C. Welder, Power Unit

NAME _____

ADDRESS _____

use margin space if necessary

"BUSINESS OPPORTUNITY"

OPERATE IT FOR LESS THAN 1/3¢ PER MILE

Cushman MOTOR SCOOTER

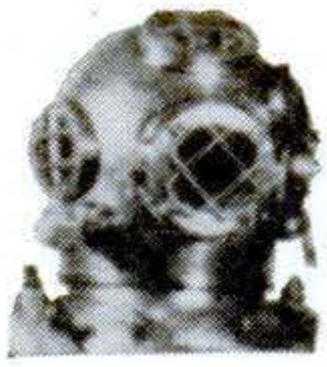
There's a CUSHMAN Motor Scooter for every transportation need—for all kinds of delivery, fits any kind of business. And CUSHMAN is America's BEST BUY in low cost transportation—proved by thousands of individual users. Go anywhere—Park anywhere . . . Start your own commercial delivery with CUSHMAN Motor Scooters—low initial investment, low operation and upkeep—a real BUSINESS OPPORTUNITY. See your dealer for demonstration or

WRITE DEPT. PS-49 for Details.

Established 1901

DEALER INQUIRIES INVITED

CUSHMAN MOTOR WORKS, Inc
LINCOLN, NEBRASKA USA



G. I. DIVERS!

Don't let your training go to waste. Commercial Divers earn up to $80 a day.

In your spare time you can do odd jobs—clean pools or tanks, retrieve golf balls or outboard motors, locate sunken boats, etc. Very **LOW COST** complete Gov't surplus **EQUIPMENT** available—either deep water or shallow water.

Catalog 15c on request

Other marine surplus — sextants, barographs, bells, life preservers, M & T barge units, anchors, etc.

M & E MARINE SUPPLY CO. P. O. Box 601-G Camden, New Jersey

Get DeLuxe SEAT COVERS

FACTORY TO YOU . . . Way Below Retail from $3.98

Same material as in covers up to $25. TOPS in smart styling and value. Expertly tailored in stunning plaids with rich leatherette trim—glove-like fit.

SEND NO MONEY *5 Day Money Back Guarantee!*

GAYLARK PRODUCTS, 615 N. Aberdeen, Chicago 22 ILL. 20

- ☐ Complete Front and Back covers $8.95 ☐ Front Seat Cover only $4.98
- ☐ 3-pass. divided back coupe $4.98 My car is a 19____ Make_____
- ☐ 3-pass. solid back coupe or rear seat of coach or sedan $3.98
- ☐ Type 1 ☐ Type 2 ☐ Type 3 ☐ 2-door ☐ 4-door
- ☐ Rush postpaid $_____enclosed ☐ Send C. O. D. plus postage.

NAME _____ (please print)

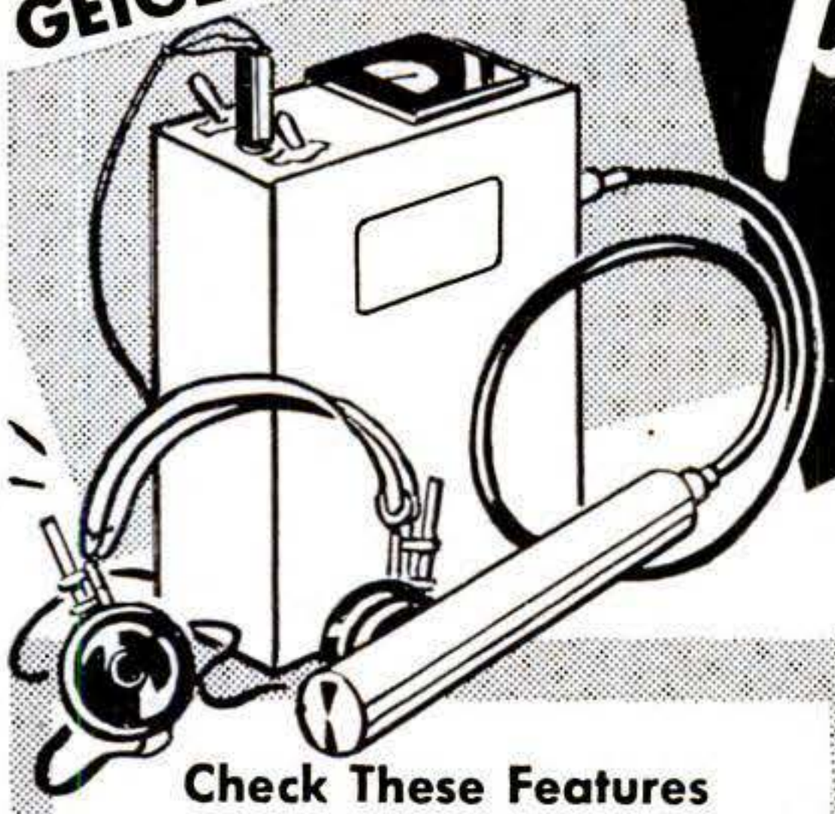
ADDRESS _____

CITY _____ ZONE _____ STATE _____

Copyrighted material

DEALER INQUIRIES INVITED

MODEL TX-8 GEIGER COUNTER



Prospect With A GEIGER COUNTER

Every major strike of radioactive ores except one, in the past two years was made with an Omaha Scientific Geiger Counter.

'URANIUM PROSPECTING'
by Victor Shaw

A new manual for uranium prospectors. Tells how to use a Geiger Counter—what minerals to look for—what states have uranium—full of valuable information. Advance orders now being taken. $2.00 per copy.

Users Report Excellent Results

THE TX-8 GEIGER COUNTER is the latest, lightest and most sensitive device constructed for prospecting radioactive ores. So light it may be carried on your belt.

Check These Features

- COMPACT — Weighs only three pounds yet is as sensitive as larger units.
- SIMPLE TO OPERATE — Only two switches to control meter and amplifier.
- RUGGED — Hardened, polished aluminum case stands roughest use.
- ECONOMICAL — Inexpensive batteries will last six months.

☐ Please send me "URANIUM PROSPECTING" when ready. $2.00 remittance enclosed.

☐ Please rush complete information on Geiger Counters.

Name_____

Address_____

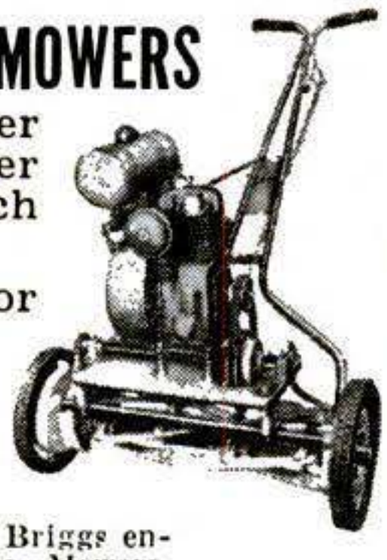
City_____ State_____

Write today for details and prices TO:

OMAHA SCIENTIFIC SUPPLY CO.
Dept. 5, 3601 No. 24th St., Omaha 10, NEBR.

Takes less than 3 hours to Convert

HAND MOWERS TO POWER MOWERS



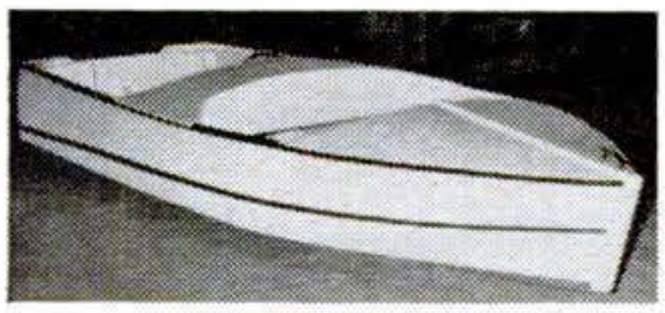
- Handy-Dandy Lawn Mower Kit fits any hand mower from the 16 to the 20 inch size.
- Kits furnished separately or with power units.

Snow Plow attachment available for Handy-Dandy Kits.

Kits available for Power Products, Maytag, Lauson, Briggs Stratton, Clinton, other small gas engines or electric motors. In stock ¾ or 1½ h.p. Lauson or Briggs engines and 19" heavy duty Pennsylvania Mowers.

DEALERS WANTED

LE CLAIRE MANUFACTURING CO., LE CLAIRE, IOWA
Dept. P.S. 151



12' UTILITY BOAT

BUILD YOUR OWN

FACTORY BUILT BOAT IN A KNOCK-DOWN KIT FORM

All parts cut and fitted ready for assembly. Our blue print and picture instructions make the Fullerton Boat easy to build. Every operation is fully described in picture form with directions and assembly notes—Marine Water-Proof Plywood—Oak—Select White Pine—Brass Screws—Water-Proof Resin Glue—Splash Rails. **Write for Information.**

FULLERTON BOAT CO. • BOX 55 • FULLERTON, PA.

HOW TO SAVE MONEY ON AUTOMOTIVE MILLINERY • *BUY RETAIL AT WHOLESALE PRICES!*

Give your car that snappy streamlined "1949 New Look" with these latest style-line chrome creations. These accessories are precision manufactured out of the best materials. We guarantee you'll be satisfied or your MONEY-BACK on any item. Look over these amazingly low prices. Only our policy of mass-buying permits us to sell so LOW. ORDER TODAY!

STAINLESS STEEL ALL-WEATHER SHADE
Fits outside Rear Window. Stainless steel, chrome-like finish. Triple protection against Sun, Wind, Rain, Snow, etc. **$6.95.** Chev., Pont., Buick, Olds, 41-48. State make, Model, year.

EXHAUST EXTENSIONS
Heavy steel, chrome plated, Hollywood design. Custom built for your car. State year, make car. Ea. **$1.29.** Universal models—same as above, **$1.50.**

STEERMATIC
Retractable steering wheel spinner. Beautiful styling. Automatically folds out of way when not in use. Ea. **99c**

STEEL FENDER SKIRTS
Every car needs these. Fit snugly. Secure locking lever. Lots of quality rubber. Won't rattle. Permanent. Tear drop style, most cars, 36-41. Special—pair **$10.95.** Streamline design for later popular cars, 41-48 **$10.95.** Special—'49 Ford, **$9.45.** Also for Dodge, Plymouth, Chrysler, DeSoto, 46-48, **$9.45.** State year, make, model.

GRAVEL GUARDS
Highly polished, chrome-plated steel. For 42-48 Chev. only. Set of two—**$4.50.**

ORIGINAL SMITHY'S MUFFLERS
The original Smithy's mufflers. Deep mellow tone. Dual custom-built muffler sets for Ford V-8 and Mercury. Low as **$23.00.** Singles from **$5.50.**

CHROME-PLATED BRASS WHEEL RINGS
Snap instantly in place. Enhance appearance of your car. Fit all cars, models. **Set of four, $9.50.**

HOOD LOUVER ORNAMENTS
Give your car that 1949 Buick Dynaflow look. Set of 6, easy to attach, **$3.75.**

All items shipped postpaid in U.S.A. *except mufflers and fender skirts. Send check or money order. 25% dep. on C.O.D.'s. We ship day we get your order. MONEY-BACK GUARANTEE all items. You must be satisfied! SEND IN YOUR ORDER NOW! Make your car look up to date.* Send 10c big illustrated catalog.

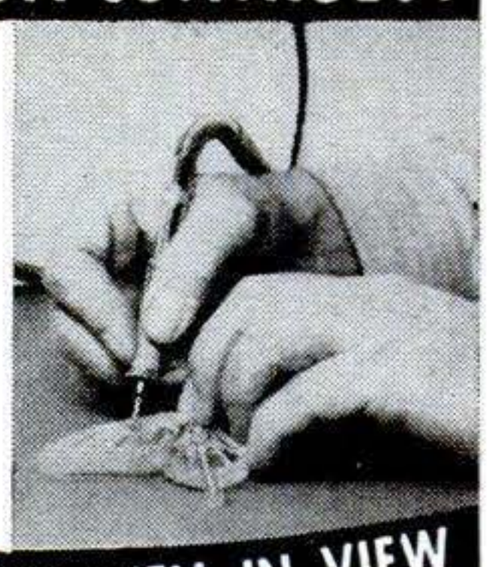
AUTOMOTIVE MILLINERY OF HOLLYWOOD P. O. BOX 2452 TERMINAL ANNEX LOS ANGELES 54, CALIFORNIA

Copyrighted material

Provides PRECISION CONTROL..

because

FOREDOM #99 FLEXIBLE SHAFT MACHINE with PENCIL-SIZE HANDPIECE..



KEEPS YOUR WORK WELL IN VIEW

35" FLEXIBLE SHAFT • $15.95 COMPLETE WITH MOTOR

GRIND—POLISH—SAW—SAND ETCH—ENGRAVE—ROUT—CARVE MILL—CLEAN

Use on all metals, wood, plastics, glass, leather, linoleum, etc.

REMEMBER that in the precision-made FOREDOM you get MORE POWER—LONGER MOTOR LIFE because MOTOR IS NOT DWARFED TO FIT HAND. DOES HUNDREDS OF JOBS WITH MARVELOUS EASE because pencil-size handpiece gets into hard-to-reach places—provides positive, easy, precision control.

Profit by experience of many thousands of Foredom users—over a quarter century experience stands behind the product. Other heavier-duty models at proportionately reasonable prices.

No. 25 Accessory Set (a truly versatile assortment) $5.50 extra. Also No. 999 Kit, comprises No. 99 Machine, illustrated, and set of 12 accessories, all in wooden case for only $19.95. 6-step Foot Rheostat $4.85. Over 70,000 Foredoms in use.

AND HERE'S ANOTHER AMAZING FOREDOM PRODUCT

Foredom PRESTO-FLEX with PENCIL-SIZE Handpiece $5.95

Now turn your old motor, drill press, or electric drill into a Flexible Shaft Tool. Simply attach to your electric drill, drill press or motor. Presto—a flexible shaft machine! Off again in a jiffy! Pencil-size handpiece gives you finger-tip control. Gets into tight places you can't reach with any other tool. Handy 35" overall length. And—only $5.95 complete! Not to be confused with inferior imitations. Precision made, backed by 1/4 century experience in this field. All parts replaceable. Order NOW. If ordered for use on motor, specify motor shaft diameter and add 50c for coupling. (Available for 1/4", 5/16", 3/8", and 1/2" shafts.) No. 50 Accessory Set available $1.50 extra. Order TODAY.

FOREDOM ELECTRIC CO., Dept. A-1017
27 Park Place, New York 7, N. Y.

Mail Coupon Now

Please send me FOREDOMS checked below on 10-day trial.

- ☐ Presto-Flex Tool ($5.95)
- ☐ Motor Coupling (50c)
- Specify motor shaft diameter..
- ☐ No. 99 Machine ($15.95)
- ☐ No. 50 Accessory Set ($1.50)
- ☐ No. 25 Accessory Set ($5.50)
- ☐ Foot Rheostat ($4.85)
- ☐ No. 999 Kit ($19.95)
- ☐ Send C.O.D. plus postage. I will pay postman. ☐ Free Catalog.
- ☐ I enclose payment. Send postpaid.

(Money back either way if not delighted)

Name.....
Address.....
City.....Zone....State.....

New MILLING ATTACHMENT

Sizes for 8" to 16" metal lathes

Build it yourself from our sets of semi-machined castings and save $$. **Can be finished on your lathe alone.** Complete drawings and instructions furnished with castings. Mill keyways, slots, splines, dovetails, flutes in reamers, special cutters. Produce gears, ratchets, racks; bore, face, etc., with this precision attachment.

FREE! Illustrated folder and price list of castings, milling cutters, etc. Write today. Mention your lathe.

HURON MACHINE AND TOOL CO.
YALE 2, MICHIGAN

FOR HANDY, EASY TO USE CONVENIENCE *YOU CAN'T BEAT A..* CARLSON RULE

WITH 10-SECOND BLADE CHANGE

SAVE 50% BY GETTING AN EXTRA BLADE

And with a Carlson Rule you can buy an extra blade for about half the cost of a new rule. When a blade is accidentally damaged or numerals become worn, you don't have to buy a new rule. Just get an extra blade and insert it without opening the case. Presto, in 10 seconds a "new" rule for half the cost!

ASK YOUR HARDWARE DEALER

CARLSON STEEL TAPE RULES
MONROVIA • CALIFORNIA

FASTEST PLANER in the WORLD at this Low Price... $215.00

BELSAW Multi-Duty Planer

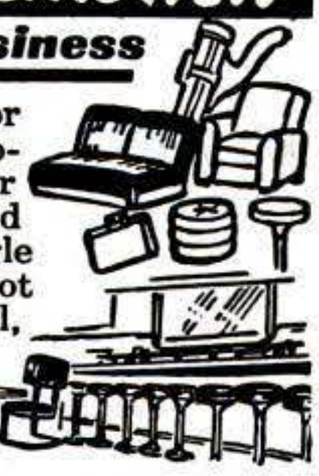
Speed up production! Increase your profits! BELSAW power self-feeds at 24 feet per minute...The lowest-priced surfacer that will handle 12 x 6 in. stock. Planes green or dry sawed lumber into smooth, worked forms. Three high-speed steel knives make 42 cuts per inch. Multi-duty BELSAW takes inexpensive attachments for all planing mill operations — Jointing, Rabbeting, Grooving, Matching. BELSAW is the ***only*** 12 in. planer providing ***attachments for jointing and grinding its own knives.*** Start planning NOW for BIGGER VALUE and BETTER PERFORMANCE, with BELSAW. Write for FREE specifications, illustrations and low prices.

● LARGER CAPACITY ● FASTER OUTPUT ● KNIFE SHARPENING ATTACHMENT

BELSAW MACHINERY CO B1025 Field Bldg., 315 Westport Rd., Kansas City, Mo.

One Swipe of NEW PLASTIC Makes these LEATHER and LEATHERETTE Items *LIKE NEW*

Get Into A Money Making Business



Make like new, worn, scuffed or faded leather and artificial leather equipment. Either your own to renew, recolor and beautify, or cafe, restaurant and hotel equipment as a business. Single stroke with a brush renews. Does not crack, peel or scuff. Resists acid, alcohol, caustics and weather. All colors. Mail coupon for free sample.

FREE Sample SHOWS EFFECT

$50 to $500 Profit On One Job Possible

Let me show you how, as I have shown others. Get your own exclusive territory while available. Mail coupon today, I'll do the rest. — Jack Edwards, *Sales Mgr.*

LEATHER-NEW PRODUCTS,
6082 Suney Slope, Kansas City, Mo.
Send me without obligation a sample of Leather-New coated material so I can inspect it.

Name.....
Address.....
City..... State.....

Copyrighted material

POWERFUL, LIGHTWEIGHT

Mustang

All the power of a big motorcycle at half the price

Excellent workmanship and design includes

- **Hand Operated Clutch**
- **Foot Shift 3-Speed Transmission**
- **Telescopic Front Forks**

COMPLETE RIDER CONTROL

ECONOMICAL • MANEUVERABLE

Ask your favorite dealer about the sensational new Mustang, or write for illustrated folder.

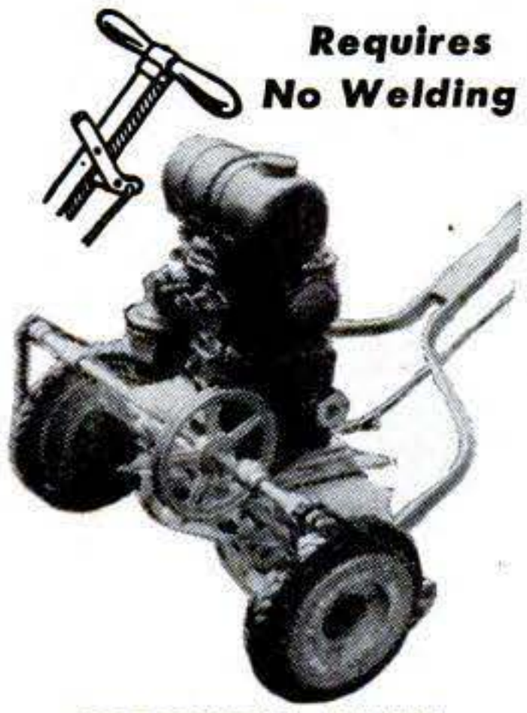
IMMEDIATE DELIVERY **EASY TERMS**

A few choice dealerships still open

MUSTANG MOTORCYCLE CORPORATION

635 W. Colorado, Dept. GP 1, Glendale 4, California

"MOWER POWER"



Requires No Welding

PRECISION BUILT To Last a Lifetime

COMPLETE ATTACHMENT. For Either Electric Motor or Gasoline Engine. Fits Any Make or Size of Lawn Mower. POSITIVE CHAIN DRIVE and FREE WHEELING. Easy to Install, in Less Than an Hour. IMMEDIATE DELIVERY. Sold Direct to you at Factory Price, ATTACHMENT..... **$27.80**

ENGINE

Powerful 2 H.P. 4 cycle air cooled gasoline engine. Weight 30 lbs. Precision made for years of dependable service. Designed for rugged work. Smooth running and quick starting at any temperature. No vibration. Sold direct to you at Factory Price, ... **$55.50**

ROYAL ROTARY MOWER

New "Royal Rotary Mower" for either gasoline or electric motor is the most economical and practical mower ever made. Cuts with a smooth finish through any Lawn. Spike grass, dandelions and high weeds. Clippings are scattered evenly. No need for raking or after turning. 20-inch cut. Easy to adjust cutting height. Weighs only 34 lbs. Sold direct at factory prices. Without motor. **$50.00**

ABSOLUTE MONEY-BACK GUARANTEE

WRITE FOR FREE FOLDER TODAY

ROYAL OAK LAWN MOWER SHOP

P. O. Box 48 ***Royal Oak 2, Michigan***

Free...

YOUR 1949 PHOTOGRAPHIC CATALOG

OVER 1000 ILLUSTRATIONS—descriptions and prices of more than 1700 pieces of photographic equipment are included in Montgomery Ward's big, new Photographic Catalog.

THE NEWEST IN STILL CAMERAS — the sensational new Land camera that gives you a finished print just 60 seconds after you snap the shutter! The new Bell & Howell Foton automatic 35 mm. (takes up to six pictures a second); the new low-priced Bolsey miniature with twin lens reflex focusing; and many others.

THE LATEST IN MOVIE CAMERAS—the new Cine Kodak Special II (approaches the capacity of professional movie cameras), the new De Jur 8 mm. with Fade-Matic control, plus Wards new complete line of sound equipment.

NEW ACCESSORIES—the latest still projectors, new enlargers, and lighting equipment. In this section you'll find everything to help you get the most from your photographic hobby.

EDITORIALS ON PHOTOGRAPHY—valuable information on developing, printing, enlarging and movie making, plus many other useful tips.

Convenient monthly payments if you wish!

MONTGOMERY WARD

Chicago • Albany • Baltimore • Denver
Ft. Worth • Kansas City • Oakland
Portland, Ore. • St. Paul

Clip and Mail this Coupon Now!

MONTGOMERY WARD, Dept. PS-59

Please send me the new 1949 Photographic Catalog as soon as printed (about May 1).

Name_____
(PRINT plainly)

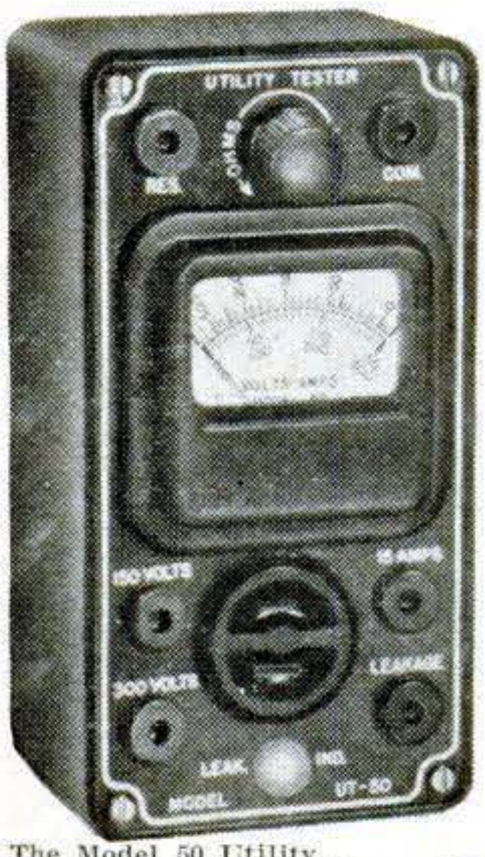
Street Address or Box_____

Postoffice_____ State_____

Copyrighted material

REPAIR RANGES • SHAVERS

• HEATERS • IRONERS • WASHING MACHINES
• WASHERS • MOTORS • TOASTERS • FANS
• VACUUM CLEANERS • AIR CONDITIONERS
• REFRIGERATORS • SUN LAMPS . . . AND ALL TYPE MOTORS FROM FRACTIONAL H.P. TO 2 H.P.



The Model 50 Utility Tester comes housed in a round cornered molded bakelite case. Complete with all test leads and operating instructions—only **$13.90**

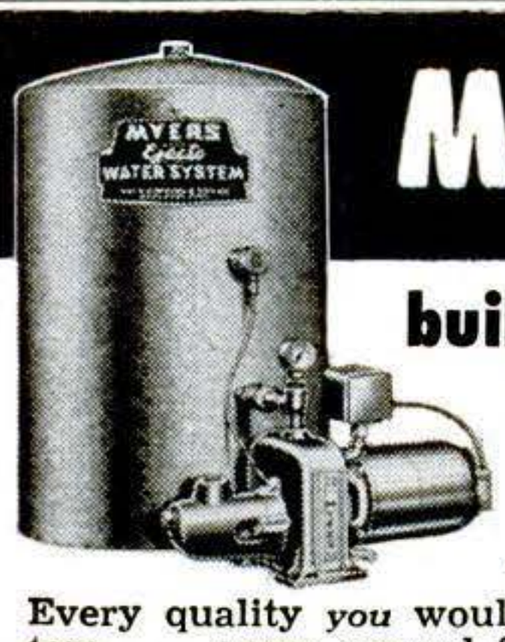
20% deposit required on C.O.D. orders.

The Model 50

ELECTRIC TESTER

Tests Thermostats under ACTUAL WORKING CONDITIONS: Measures the ACTUAL CURRENT CONSUMPTION of any appliance either A.C. or D.C. WHILE THE UNIT IS IN OPERATION — reading will be direct in amperes. Incorporates an ultrasensitive direct-reading resistance range which accurately measures all appliances and utility resistances. Indicates excessive leakage between motor and line. Will measure the actual voltage and indicate whether the current is A.C. or D.C. and if the frequency is 25 cycles or 60 cycles. Sold on money-back-if-not-satisfied basis.

GENERAL ELECTRONIC DISTRIBUTING CO.
Dept. PS-5 98 PARK PLACE NEW YORK 7, N. Y.



Myers water systems

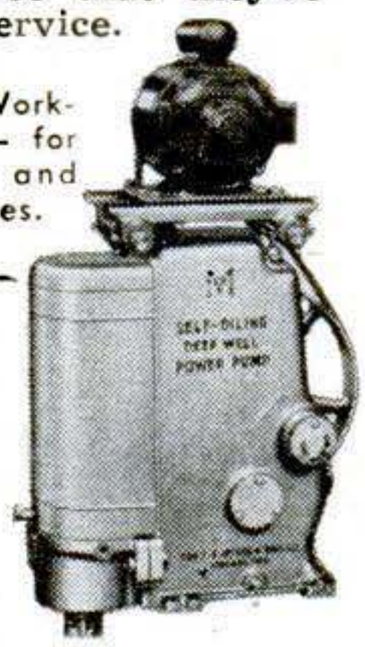
built as YOU would have them built

"H" Series *Ejecto* — for shallow and deep wells.

Every quality *you* would specify in a water system . . . every proved feature for advancing efficiency and extending service life . . . you'll find at its best in a Myers Water System. In each of these world-famous systems, nothing is left undone to make it the most economical, most dependable unit of its kind available. Study the cross section views of Plunger and *Ejecto* Types shown in the latest Myers Water System booklet. Note how the complete Myers line is so functionally *right* in every detail. You'll agree that they're America's top values for water service. Mail coupon *today*.

TAKE OFF YOUR HAT TO MYERS

Self-Oiling Working Heads — for deep wells and higher pressures.



THE F. E. MYERS & BRO. CO.
Dept. N-270, Ashland, Ohio

Send free water system booklet

Name_____
Address_____
Town_____ State_____
County_____

SURPRISE VALUE

100 Pieces $1.00 FOR ELECTRIC GRINDERS — Post Paid in U.S.A.

Grinding Wheels, Cut-off Wheels, Sanding Discs, Mounted Stones, Sharpening and Honing Stones, Rotary Cutting Burs, Abrasive Cartridges, and many other items. Rush check or Money Order.

18 ROTARY CUTTERS

$13.50 Value **$5.85** Post Paid in U.S.A.

Assorted sizes cutter on 1/8" or 3/32" shank. Will fit all hand grinders. Ideal for cutting wood, metal, or plastic. Brand new.

2 CIRCULAR SAWS

ON 2 MANDRELS— ALL AT ONE LOW PRICE

1" diameter saws on 1/8" Mandrels. For cutting wood, plastic, or soft metals. Order at once! Send Check or Money Order for this big bargain.

$1.50 Post Paid in U.S.A.

SCHUPACK SUPPLY CO., 7331 Cottage Grove, Dept. S5, Chicago 19, Ill.

1/4-TON ARBOR PRESS

Ideal for straightening, bending, light stamping, riveting, staking, production assembly and general presswork. Used ten years in plants and shops—bushings, cameras, reels, typewriters, instruments, light molding, etc. Grey iron castings. Height 7 1/2" over table 2 1/2"; over base 4 3/4"; ram 5/16" x 7/16"; ram travel 2 1/4"; approx. pressure 500 lb. Weight 7 lb.

See Your Dealer or Order Direct. No C.O.D.'s Please.

$9.50 POSTPAID U.S.A., MONEY-BACK GUARANTEE

H. D. HERDER, Tool Specialties
2423 Brook Dr. KALAMAZOO 82, MICH.

THE *Eager Beaver*

A man-size ball-bearing bench saw for only..... **$10.95** PLUS TAX

Guaranteed to Cut 2 x 4's

IMMEDIATE DELIVERY
LOOK AT THESE FEATURES:

1. All metal construction
2. Smooth-rolling ball bearings
3. Light and portable
4. Adjustable rip fence
5. Indexed mitre gauge
6. 1 1/2" arbor pulley
7. Full two inch cut
8. Designed for safety
9. Table size 12 1/2"x13 1/2"
10. 6 in. combination blade

If your dealer cannot supply you send check or money order with dealers name. We'll ship prepaid. *Price does not include motor. No C.O.D.'s please.*

SIERRA TOOL CO., INC., 1618-F North Vermont Ave. Los Angeles 27, California

SANDEE

A SANDEE Sportone will outlast two ordinary mufflers and give More Power! More Speed! More Mileage!—plus a tone quality unsurpassed.

Please ship (item):_____ Price_____
Car and Year_____ Name_____
Address_____

SANDEE MUFFLER CO. 5643 Corryne Pl. Culver City, Calif.

Copyrighted material

The only paint spray that gives you

1 HORSEPOWER PERFORMANCE AT 1/3 HORSEPOWER COST

Brand new! Just out after exhaustive field and laboratory tests. Now you can have a really "professional" paint spray made by BINKS, manufacturers of world famous industrial spray equipment.

Compressor weighs only 47 lbs. but delivers 1 h.p. spraying performance for cost of only 1/3 h.p. unit. Built for easy portability—even up a ladder. For serious finishing, maintenance, craftwork, farm jobs, light production. Handles any finish from undercoater out. Supersafe; all moving parts enclosed. GUARANTEED. Operates on 110-120 v., A.C. Gives 40 lbs. pressure.

Free literature. Send today for free folders telling all about the BINKS new DP compressor, gun, and accessories. Or ask your local dealer to show it to you.

*DP means Direct-drive Piston.

Binks MANUFACTURING COMPANY
Dept. DP2, 3114 Carroll Ave., Chicago 12, Illinois

EXTRA PROFITS FOR SAW SHOPS

WITH BEMACO RAPID SAW SET

IT'S AUTOMATIC

Sets hand saw teeth in 60 seconds—Approx. 400 band saw teeth. 4½ to 12 points with one adjustment. Hammer and anvil action does precision job. Every tooth alike—no breakage.

IMMEDIATE DELIVERY

WRITE TODAY

HAND SAWS BAND SAWS HAND SAWS BAND SAWS HAND SAWS BAND SAWS

BEAVER MFG. CO.
800-D South Isis Avenue, Inglewood, California

GIVE DINGY FURNACE THE ONCE-OVER "BRIGHTLY"

with the *right* aluminum paint

• FREE BOOK TELLS HOW you can make an old furnace or water heater look like new; how heat-resisting *Aluminum Enamel* gives lasting beauty and protection against rust. For many other helpful painting hints, send for free 24-page book, "Paint It Bright". Remember there *is* a difference in aluminum paints. Get *Aluminum Enamel* for this job, from the dealer who displays this Alcoa symbol on the brand he sells. Address: Paint Service Bureau, ALUMINUM COMPANY OF AMERICA, 689 Gulf Building, Pittsburgh 19, Pa.

Look for this shield on aluminum paints made by many paint manufacturers using

ALCOA ALBRON PIGMENTS

4 SPEED MOTOR

WITH 1000 USES!

The built in integral gear box has four ¼" drive shafts turning simultaneously at the following speeds:

4000 RPM for grinders, buffers, small drills, flex shaft tools, etc.
150 RPM for wrapping fishing rods, driving pumps, slow speed tools, fans.
25 RPM—rocker for photo developing tray, cabinet makers glue wheel, erector sets, film puller for 16 mm. developer, operating laboratory equipment, etc.
5 RPM for turning barbecue spits, advertising displays and antennas.

A THOUSAND OTHER USES AROUND THE WORKSHOP

This 1/20th HP, 115 V., 50/60 cycle, AC motor is precision built throughout.

Fully guaranteed—Money refunded if not satisfied

Pulleys, belts, shaft couplings, Mandrels and other equipment at 15c to 60c. List sent with motors. SPECIAL—while they last.....

Californians please add 25c sales tax

- For amateur beam & television antenna
- Drives working models, toys and gadgets
- For action displays, miniature fountains
- For doctors, dentists, jewelers, technicians

$9.95 SENT POSTPAID

TROUP ENGINEERING CO., 2223-C Grand Ave., Long Beach, Calif.

Copyrighted material

THE WORLD'S FINEST SURPLUS BARGAINS

2 in one Mat Raft

For Water or Beach

4.98 6 Cell

5.98 8 Cell

Easily inflated by mouth or cartridge. Separate air cells for safety. Folds compact when deflated. 2 sizes—6 cell, 55"x24"; 8 cell, 55"x30". Complete ready to use. Save one-half.

Extra Dual Tubes ..... $1.19 ea.
Inflating Cartridges, 10 for 79c

LIFE RAFTS

AT A FRACTION OF THE ORIGINAL GOV'T COST

$29.50

5 and 7 man life rafts equipped with paddles, pump and carrying case. Perfect condition. Issued but never used. Separate air compartments for safety. Govt. cost approx. $159.99.

GENUINE U. S. ARMY TROPICAL Water Bag!

Famed mechanized troop bag designed to keep water drinkable over deserts, jungles, mountains, etc. Separate latex lined water bag encased in a sturdy OD canvas carrying pouch. Push button spigot for easy pouring. Worth $5.95.

$1.98

SUN GLASSES

Made by the manufacturer who made thousands of pairs for the Army Air Forces. These fine sun glasses are made of the same frames and lenses as others selling up to $6.00. Each pair has lifetime guarantee!

$1.98

M-6 Genuine COMPASS

A real precision instrument made to rigid Govt. specifications. Universal bracket easily mounts on cars, trucks, boats, planes, etc. Nite lite, instruction book and calculator included.

$5.95

NYLON Jungle HAMMOCKS

Never before at these low prices! They're insect proof, rot proof, and bug free. Fine mesh, genuine Nylon net sides.

4.98

Waterproof rubberized top and bottom. Complete with ropes, hanging rings, etc.

FOLDING O.D. ARMY COTS

4.98

BRAND NEW!

Brand new genuine U.S. Army Cots. Heavy canvas cover. Rigid hardwood frames. Steel braced legs. Approx. 27"x78" open. Folds compactly for easy storage. Ship. wt. 25 lbs. Shipped Frt. or Exp. collect.

WORLD WIDE MAIL ORDER SERVICE!

$3.98	Floating Minnow Bucket, new 2 pc.	$1.98
4.98	Army Steel Frame Ruck Sack, used, good	2.75
1.98	Pith Sun Helmet, OD color	1.19
3.98	Wool Sleeping Bag, zipper enclosure	2.25
60.00	McClellen Army Saddles	15.95
10.95	2-Burner Coleman Camp Stove	8.95
9.95	G.I. Pocket Stove	7.95
1.98	Hunt. Knife, 5" blade with sheath	.98
4.95	Premax 4½' Rod & Reel	2.49
1.19	Canvas Bucket, 10 qt.	.69
8.95	Combat Boots, double sole	5.88
2.98	25-Ft. Tow Cable	.98

Mail orders add 10% for packing and shipping. Send deposit or check with order. Every item guaranteed as advertised.

TENTS

Weather proof
Water proof
Fire proof
Mildew resistant treated

9'x9' New Wall Tents	$29.50
Poles for above	2.50
16'x16' Pyramidal Tents, used	27.50
Poles for above	4.50
16'x32' Squad Tents	49.50
Poles	8.75

Tents & Poles Shipped Frt. Chgs. Collect

FISLER SALES CO. FREE CATALOG

Over 250 Surplus Bargains

WRITE TODAY! 723 Walnut St. Kansas City 6, Mo.

This Machine Should Cost $69.95

5 POWER TOOLS in ONE

Drill press pulls ½" drill in steel; saw takes 8" blade; lathe 10" swing, 30" centers; sander 8"; emery wheel 5" Handles big, heavy work — tools easily interchangeable — uses ¼ to ½ H.P. motor. Factory-to-you price only $39.95 complete. Send $18.00 (balance COD) on 10-day FREE trial, money-back guarantee, or write today for FREE catalog.

HOME WORKSHOP

See it - Use it!
FREE TRIAL-10 DAYS

EMRICK, INC., 1661 Clinton, Kalamazoo, Michigan

BUILD HEAVY DUTY MACHINES

SAVE UP TO 90%

You can build, using our practical, easy-to-read plans, all kinds of machines, for home, farm or shop—scooters, portable sawmills, metal working machines, concrete machinery of all kinds, printing equipment, woodworking machines, midget autos, dish washers, farm equipment, freezers, tractors.

FREE CATALOG HANDBOOK
183 SETS OF PLANS
VALUABLE INFORMATION

NICHOLS EQUIPMENT COMPANY
Dept. D2304 PURVIS, MISS.

DAISY AIR RIFLE $2.59

Real Power in Every Shot

Immediate delivery on world famous Daisy High Powered Air Rifle. Accurate, hard-hitting, low in price. Everyone who has owned a Daisy knows what a terrific thrill this hard hitting full-powered Daisy gun can give for target and outdoor shooting. Blued steel finish, natural hardwood stock, 31 inches long. Large, single stroke compression chamber. Individual colorful target box. Daisy Coppercoated BB's, 3 packages 25 cents, 12 for $1.00 ..... GUN ONLY $2.59

JOHNSON SMITH & CO., Dept. C-48 DETROIT 7, MICHIGAN

SURPLUS BRAND NEW AIR COMPRESSORS

for Garage - Shop - Factory - Farm or Home. Height 9" - Weight 7½ lbs. Uses ¼ HP Motor

$4.90

Syphon Type Spray Gun

A sturdy, well built air compressor of steel and die cast metal constructed to give satisfactory and lasting service. 20-30 lbs. continuous pressure. Higher pressure for intermittent service. Formerly sold for $14.50. Synthetic rubber hose with fitting, 12½ feet $1.70, 23½ feet $3.00.

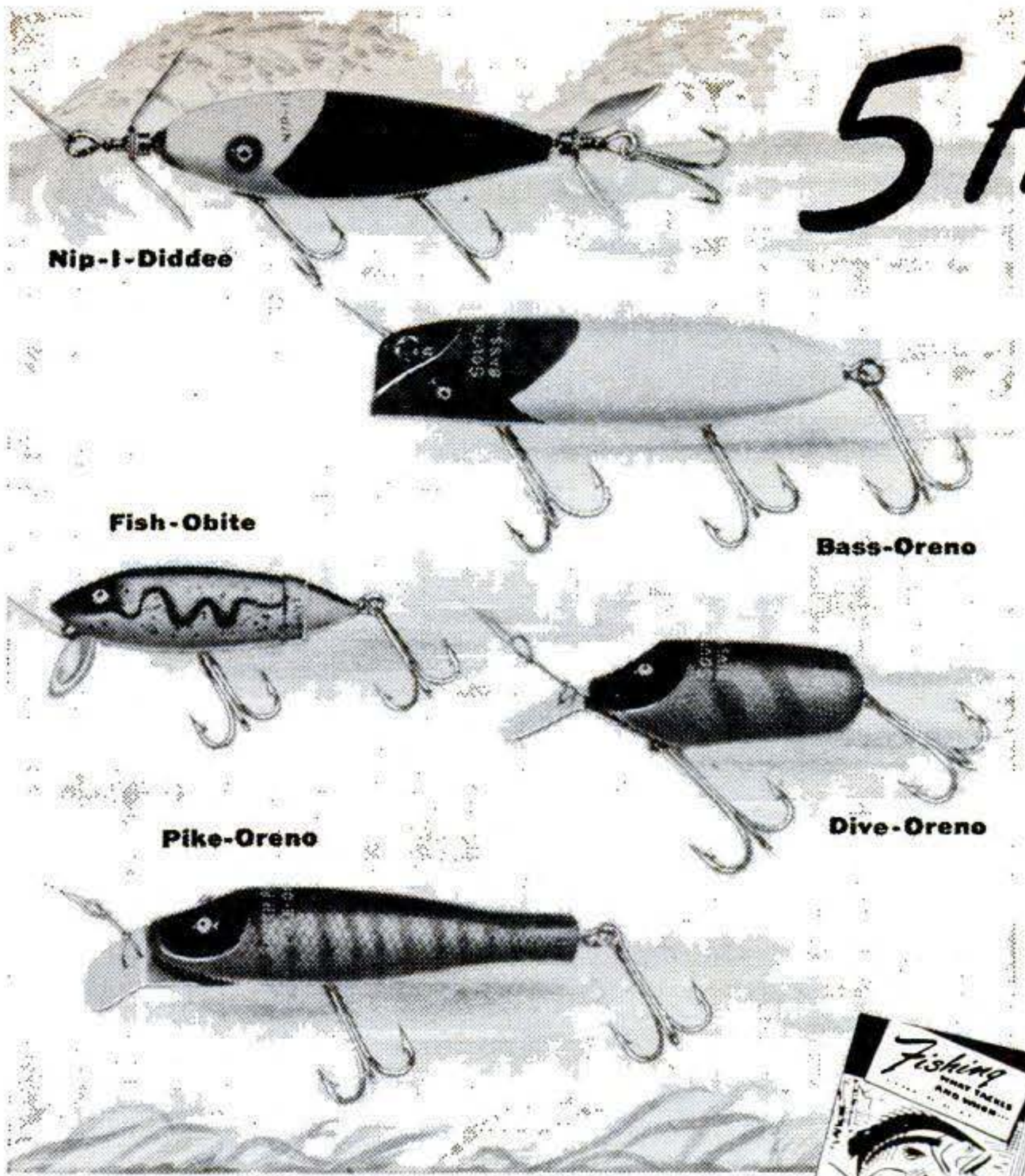
While They Last

$8.50

Orders with remittance shipped prepaid

COMPRESSOR CORPORATION OF AMERICA
ST. JOSEPH, MICH.

Copyrighted material



5 Fish Foolin' Baits

It's their tantalizing action—their lifelike finish that fools the big boys. For fish you can brag about, get these 5 baits.

No. 910 Nip-I-Diddee—new, semi-weedless, surface bait—effective action. **$1.25.**

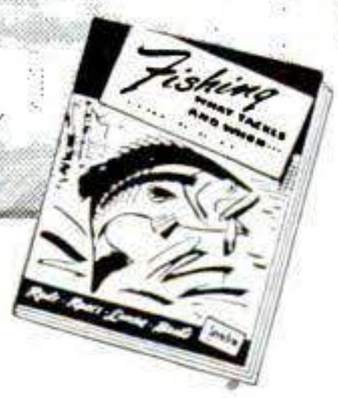
No. 973 Bass-Oreno—world's greatest and most imitated fish-getter. **$1.10.**

No. 952 Dive-Oreno—deep diving, fast-action bait that goes down and gets 'em. **$1.25.**

No. 1991 Fish-Obite—insured to catch fish, casts and trolls perfectly. **$1.25.**

No. 956 Pike-Oreno—travels deep with irresistible wiggling minnow action. **$1.25.**

Perfectoreno Reels—no backlashes. **$10** up.
Black-Oreno—*line you can trust.* 50 yds. **$1.20** up.
Excel-Oreno—finest of fly lines. **$1.85** up.



FREE! New Book on Fishing
Every fisherman needs "Fishing—What Tackle and When." 76 pages of fishing hints, tackle, etc. *Write for it now! FREE.*
South Bend Bait Co., 892 High St., South Bend 23, Ind.

SOUTH BEND *A Name Famous in Fishing*

PLASTIC HOSE

Good for water, oil, air, etc. Will stand 75 lbs. pressure
Available in 50 ft. lengths only

⅛", 3/16", ¼", (your choice) per ft.. **2c**
5/16", ½", (your choice) per ft.. **3c**
9/16", ⅝", (your choice) per ft.. **4c**
¾", 1", (your choice) per ft.. **6c**
1⅜" per ft..... **8c**

All prices F.O.B. Milwaukee. Send 25% deposit on all C.O.D. orders.
SEND 10c FOR CATALOG OF HUGE WAR SURPLUS ITEMS

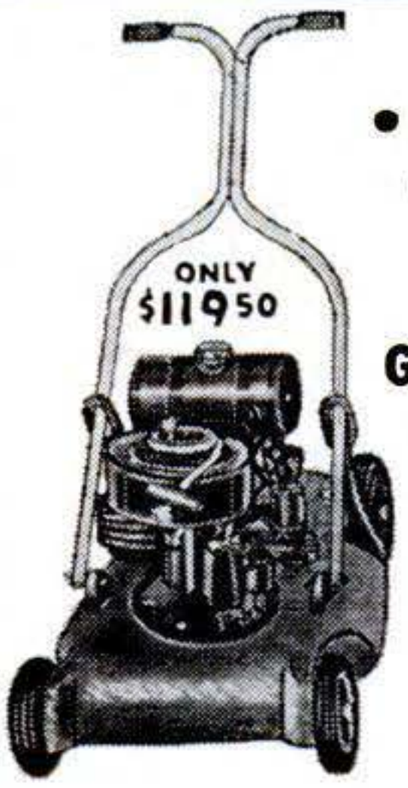
C & H ELECTRIC CO. 438 W. Juneau Ave. Milwaukee 3, Wisconsin

STOP CHANGING Motor Oil!

RE-REFINE IT As You Drive—with...
RECLAIMO The Famous HEATED Oil RECLAIMING Filter!
NOTE! U. S. Bu. of Standards (Bul. 86) states: "Oil DOES NOT WEAR OUT Mechanically"
FOR PROOF—NOT Propaganda write for STARTLING Free Book "Oil Facts."

RECLAIMO MFG. CO., Dept. S, 5083 ELSTON AVE., CHICAGO 30, ILL.

NEW POWER LAWNMOWERS



• Lightweight "easy to operate"

GAS MOWER

With 2½ hp air cooled gas engine. Makes cutting lawns a pleasure

• Cast aluminum base with 18" Rotary Blade

Make Ur-Own POWER MOWER

Just add up to 2 hp gas engine or ½ hp electric motor Easy to install

• Ball-bearing rubber tired wheels

ELECTRIC MOWER

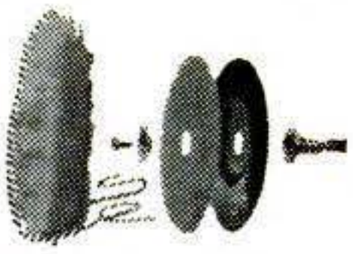
Comes complete with ½ hp elec. motor and 75 ft of cord. Just plug it in.

Prices F.O.B., K. C. Send check or money order: No COD's:

SEE YOUR DEALER OR WRITE **ATLAS EQUIPMENT CO.** 229 S.W. Blvd. Dept. P.S. 5 KANSAS CITY, MO.

Copyrighted material

NEW IDEA IN
Sanding, Polishing and Buffing Kits
For Wood or Metal, in home, shop or garage



BO-FLEX PAD COMBINATION UNIT
(patents applied for)

Perfectly balanced—light in weight

ONE DETACHABLE STEEL CENTER FITS ALL SIZE PADS
Center fits any 1/4" Jacobs chuck (or larger)
Can be used on portable motor or drill press

TWO KITS—EACH INCLUDES
1—Bo-Flex reinforced, moulded plastic rigid pad for flat or convex sanding
1—Flexible pad for concave surfaces and buffing
6—Assorted sandpaper discs
1—Chrome tanned lamb skin buffing bonnet
1—Detachable steel center
1—Set of instructions
(NO GLUE OR CEMENT NEEDED)

DEVELOPED AND MANUFACTURED by BO-MER
Engineers with 15 years experience designing and manufacturing polishing pads for automotive and industrial trade.

OUR TYPE PAD TESTED AND APPROVED
by the Engineering Laboratories of the Carborundum Co., Niagara Falls, N. Y.

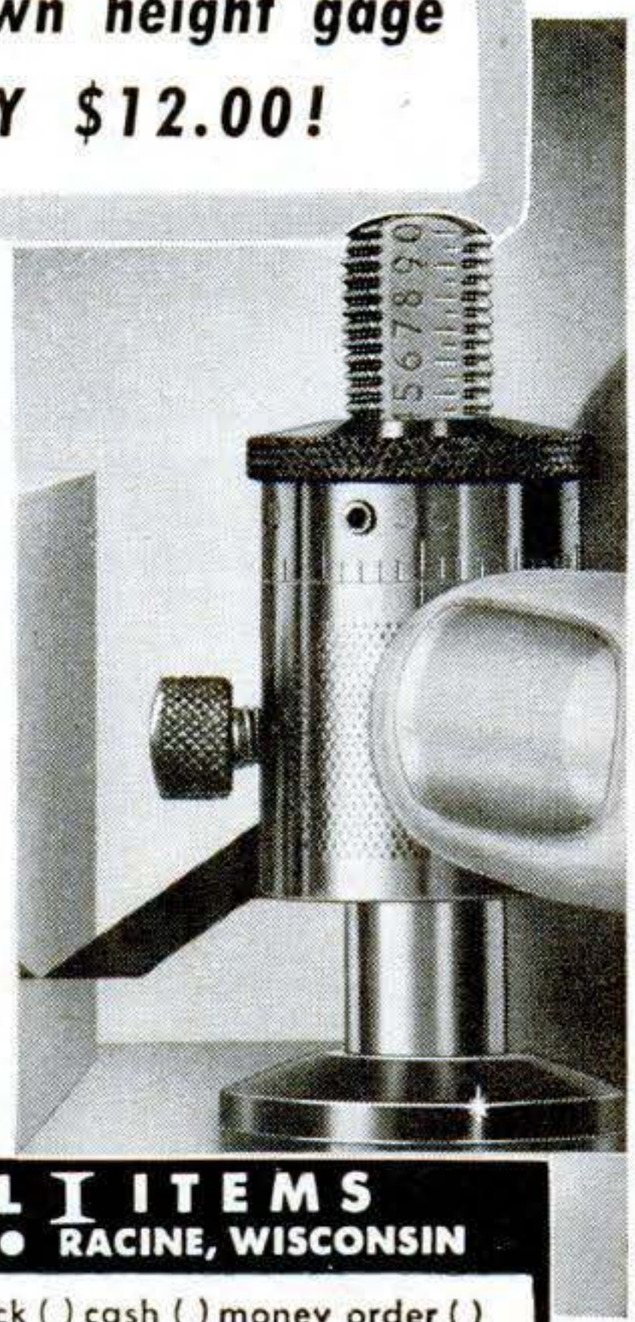
ADVANTAGES OF BO-FLEX PADS
1. High quality—low cost
2. Center fits all size pads
3. Combine pads for desired stiffness
4. Replace pads without buying center

5" kit—$2.98 Complete postage paid
6" kit—$3.98 Complete postage paid

Send check or money order TODAY to

BO-MER Manufacturing Co., Inc.
7 Columbus Street, Auburn, New York
DEALER'S INQUIRIES INVITED

NOW-your own height gage
FOR ONLY $12.00!



reads like a micrometer!

For fast, accurate layout or gaging the MIKRO-MARKER can't be beat! Small enough to be stored in your tool chest or carried in your pocket. Measures from zero to 1" by thousandths. No attachments necessary. Reads just like a micrometer. Highest grade materials and precision workmanship.

5-DAY MONEY-BACK GUARANTEE . . .

If you are not completely satisfied you can return MIKRO-MARKER within five days and your money will be refunded.

METAL ITEMS
820 SIXTH ST. • RACINE, WISCONSIN

Enclosed find check ( ) cash ( ) money order ( ) for $12.00 postpaid. Send MIKRO-MARKER to

Name _____

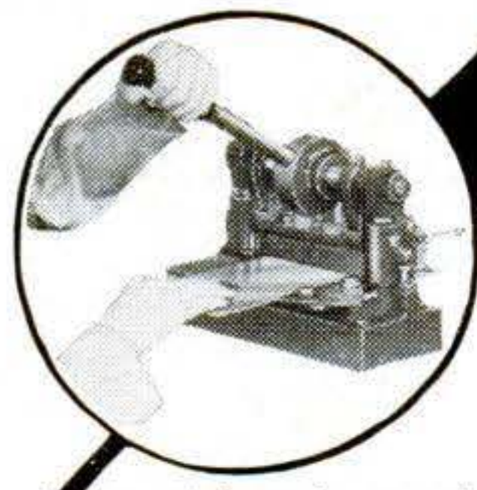
Address _____ City _____ State _____

NOW... a DYNAMIC HEAVY DUTY INDUSTRIAL WELDER

ONLY $28.50 COMPLETE

FOR AUTO—HOME APPLIANCE & FARM IMPLEMENT REPAIRS!
WORKS ON IRON, STEEL & other metals . . . does work you'd expect from a larger, costlier machine; portable, easily carried; **OPERATES FROM ANY** properly wired **110 VOLT LINE.** Also available for 220 volt operation at slight additional cost; has 8 metalic & carbon arc welding heat stages.
EASY TO OPERATE TRANSFORMER TYPE WELDER—If inexperienced you can learn to do professional work by following the **SIMPLIFIED WELDING & OPERATING INSTRUCTIONS FURNISHED**—comes complete ready to operate with helmet, rods, cable, instructions.
SAVE TIME AND MONEY—Do your own welding—Just a few repair jobs will pay for this machine. A practical and profitable machine tool for any workshop. Make money doing repair work for others. Costs a few cents to operate.

SPECIAL GIFT OFFER! WORTH $6.80
ARC TORCH YOURS at NO EXTRA COST!
Write today for FREE DETAILS, ARCH TORCH GIFT OFFER and DYNAMIC WELDER 10-Day Trial Offer.
DYNAMIC WELDER CO., Dept. 59-AT,
15 EAST 23rd STREET, CHICAGO 16, ILLINOIS



DIE-LESS DUPLICATING
with DI-ACRO SHEAR

Many small parts can be rapidly duplicated without dies, to accuracy of .001" with DI-ACRO "Die-Less Duplicating" Machines,—Benders, Brakes, Shears, Rod Parters, Notchers, Punches. Save die expense and time delay. For experimental work, samples, models, etc., as well as regular production runs. Write for "Die-Less Duplicating" circular.

O'NEIL-IRWIN MFG. CO., 342 8th Ave., Lake City, Minn.

SPECIAL OFFER!
LOCK-STITCH SEWING AWL

$1. Postpaid

Famous, patented lock-stitch sewing awl complete with needles, waxed thread and direction folder. Hundred uses — sewing, repairing leather goods, canvas, belting, harness, saddles, gun cases, awnings, golf bags. Extra needles and thread available. Satisfaction guaranteed or money back. Send currency, check or money order.
Yates Mfg. Co., 611-K Main St., Lake Geneva, Wisconsin

BUILD YOUR OWN TILTING ARBOR SAW!

SAVE $50 OR MORE

27x28 in. table stays level. Blade tilts full 45 degrees.
10 in. blade cuts 3¼ in. deep, Jackscrew depth adjustment.
Floor model, 34 in. table height.
New Departure ball bearing arbor, ¾ in. precision shaft, ready to run, ⅝ in. bore blades.
Quick-positioning, self-aligning rip fence guide. Sturdy wood, steel and aluminum construction. No machining—Build easily with hand tools only.
Capacity and performance of floor saws selling for $150.00 and up!!
GIL-BILT Step-by-Step pictorial plans (No blueprint reading required), full scale patterns, actual photographs **$1.00**

GIL-BILT Metal Parts Kit—includes Plans, ball bearing arbor, cast aluminum miter gauge and bar, rip fence guide, machined lock knobs, jackscrew mechanism with 4½ in. handwheel, and all other metal parts (less blade) **$20.95**
Same Kit with 10" combination blade **$25.90**
Same Kit with 8" combination blade **$24.90**

(Prices include postage up to 600 miles. Plans sent postpaid anywhere in the world)

Also available—Plans and Metal Parts Kits for 8" Tilt/Table Saw and 12" Band Saw. Order Plans at $1.00 each, or write or **Free** descriptive Catalog.

GILLIOM POWER TOOLS P. O. Box 1-VE, Lambert Field St. Louis 21, Missouri

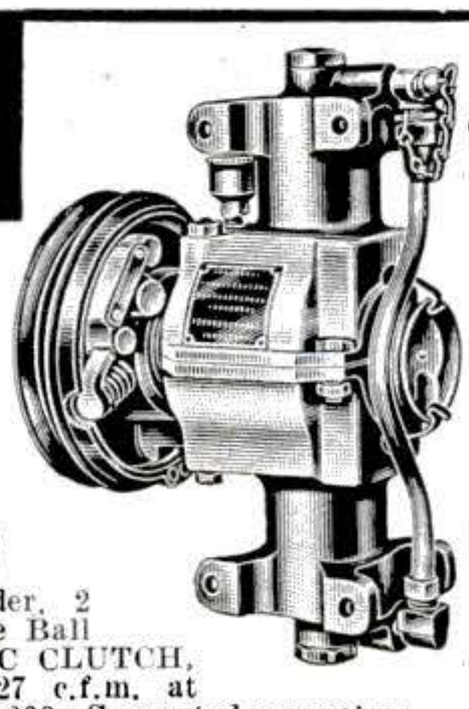
Copyrighted material

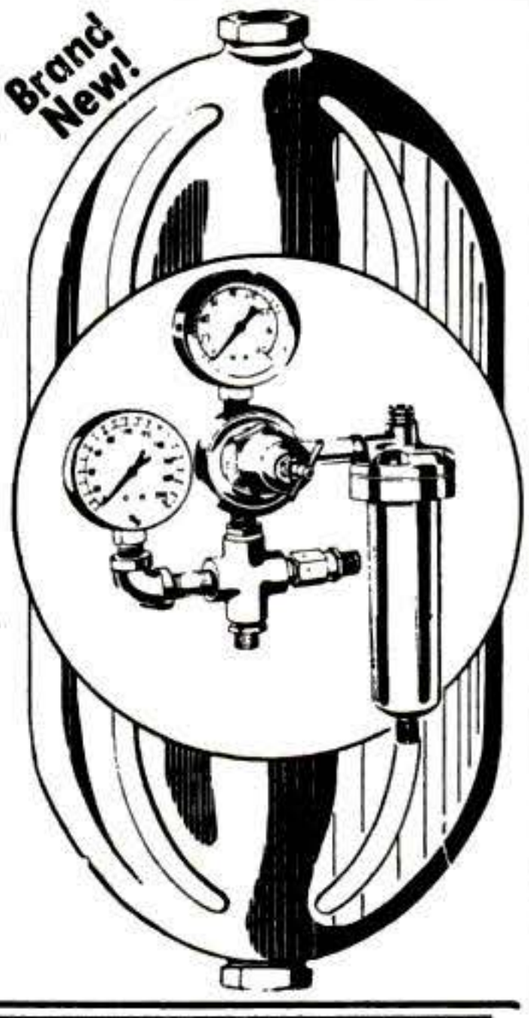
"Wellworth" Sensational Offer!

WESTINGHOUSE AIR COMPRESSOR

plus pressure tank, pop valve, gauge for tank, air regulator & gauge, filter, 20 ft. air hose, check valve & air chuck

10 ITEMS ALL For **$37.50**





IDEAL FOR HOME • FARM • FACTORY

Wherever compressed air is needed

A fortunate purchase from the government enables us to offer you this amazing buy at a small fraction of its original cost. All brand new. You get the WESTINGHOUSE COMPRESSOR and all of the accessories shown **for only $37.50.** Shipping wt. 50 lbs. Designed for automotive truck or tractor mounting. Can be run off fan belt or power take-off, or mounted horizontally. Comes with automatic clutch. Can be installed for use on farm trucks, jeeps, tractors, tire or garage service trucks, contractor or road building machinery, pneumatic devices, etc. Can be operated with ½ H.P. or more electric motor or equivalent portable gas engine. Replacement parts available.

Compressor separately $21.50
Equipment less compressor, $18.50

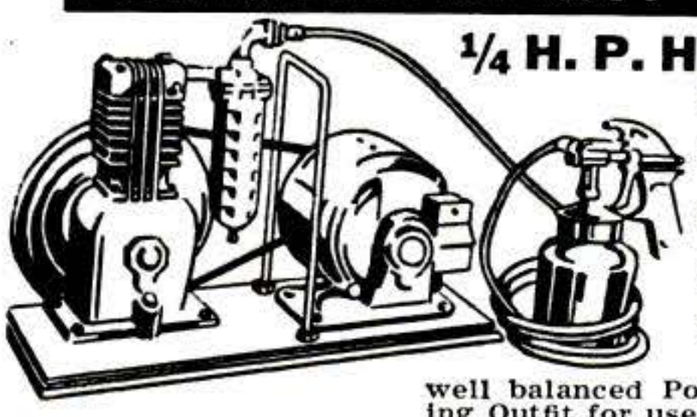
THE COMPRESSOR

Piston Type, 2-cylinder, 2 inch bore, 1½" Stroke Ball Bearing, AUTOMATIC CLUTCH, OIL FREE AIR. 3.27 c.f.m. at 600 R.P.M. 6.54 at 1200. Suggested operating pressure 75 P.S.I. DIMENSIONS: 9" wide, 11⅞" high, 6⅝" deep. Wt. 23 lbs.

AIR TANK

Stainless steel, size 12" x 24" with 2 quarter inch openings. Suitable for 150 lb. pressure. Equipped with gauge to show tank pressure, air regulator & gauge to regulate pressure, safety valve, oil and water trap.

PORTABLE SPRAY OUTFIT



¼ H. P. HEAVY DUTY

Compressor only . . $17.50
Compressor and filter . . $19.50
Spray gun and hose . . $10.45
Adj. ¼" pop valve . . . $1.50
2½" Air gauge . . $1.75

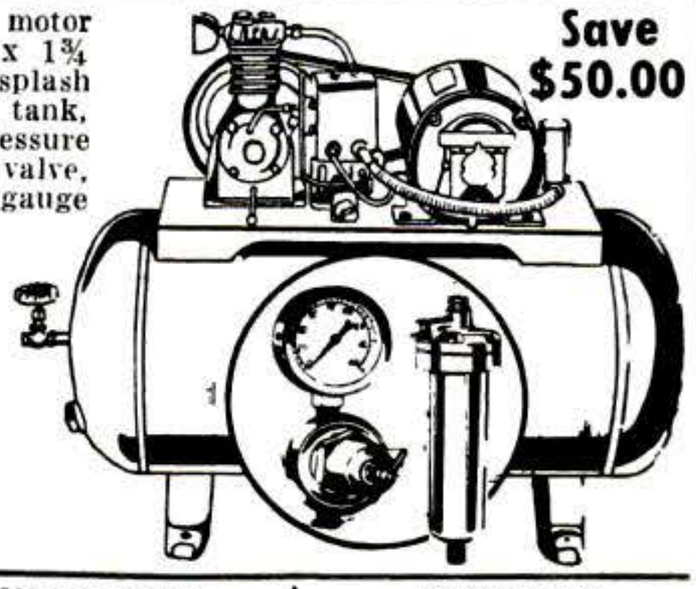
well balanced Portable Spray Painting Outfit for use where painting job requires a larger quantity of material. Sprays all types of average viscosity paints, enamels, lacquers, varnishes, etc. Piston type, single cylinder air compressor has 2 in. bore by 1¾ in. stroke. Displacement 2.86 C.F.M.; maximum working pressure 40 lbs. Mounted on sturdy wood base with rubber feet attached. Pulsation chamber is equipped with safety valve, drain cock, ¼ H.P. motor, 110-volt AC, with cord and plug; 20 ft. air hose and fittings. Spray Gun is pressure feed type, internal atomizing, with one quart metal cup. Fan and round spray nozzle furnished. Shipping Wt. 50 lbs. **$45.00**

AUTOMATIC COMPRESSOR UNIT

1/3 H.P. heavy duty capacitor motor AC 110/220 volt 60 cycle, 2 x 1¾ inch piston type compressor, splash feed lubrication, 12 x 24 inch tank, automatic pressure switch, pressure range 100 to 125 lbs., check valve, safety valve, air regulator with gauge and filter, 20 ft. air hose with air chuck for inflating tires. V. belt drive. Shipping wt. 90 lbs.

Special Price $79.50

Same unit as above with ½ H.P. motor, furnished with 13" x 24" tank. Shipping wt. 125 lbs. $98.50



Price f.o.b. Chicago. Immediate delivery. All items sold on money back guarantee. Send check or money order today. Write for free catalog.

PNEUMATIC AIR TOOLS

Riveting and chipping hammers for many uses: riveting, chipping, hammering, auto body work, concrete breaking, etc.; used, guaranteed like new.

Chicago Pneumatic Riveter & Chipping Hammer

CP4X Pistol grip handle with air control. Takes up to 3/16" rivet. Weight 6 lbs. List price $73.00.

Special Price $12.95 | **Same, as above, brand new $19.50** | **Size CP3—Takes 5/32" Rivet $8.95**

Chicago Pneumatic Lever Type AIR DRILL

With ¼" Jacob Chuck. Wt. 2 lbs. List price $55.00. Only **$15.00**

Ingersoll Rand AIR DRILL

With ¼" Jacob Chuck. Wt. 2 lbs. List price $55.00. Only **$15.00**

A.V.C. 11 INGERSOLL RAND

Push button, takes 5/32" rivet. Wt. 3 lbs. List price $65.00. Only **$8.95**

A.V.C. 10 Ingersoll Rand

Takes ⅛" rivet. Wt. 3 lbs. List price $80. Only **$8.95**
AVC 13, takes ¼" rivet. List price $93.50. Only **$22.50**

"Wellworth" AIR CHECK VALVES

Dash Pot. Quiet Operating.

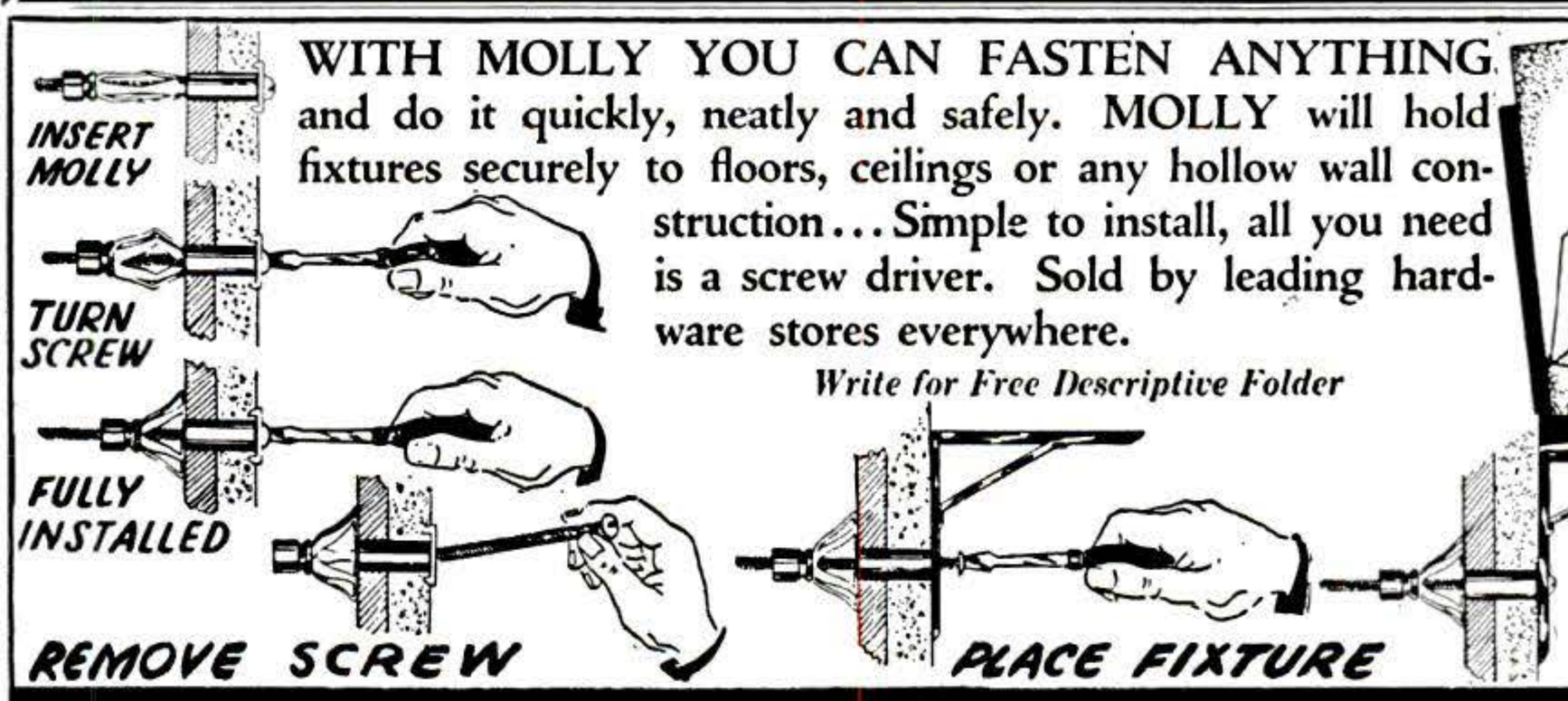
¼"	$2.75
⅜"	3.25
½"	4.50
¾"	9.50
1"	12.50

AUTOMATIC PRESSURE SWITCH WITH UNLOADER

Double pole, with 2 way release valve. Set at 125 to 150 lbs. pressure. Weight 4 lbs. ONLY **$10.25**

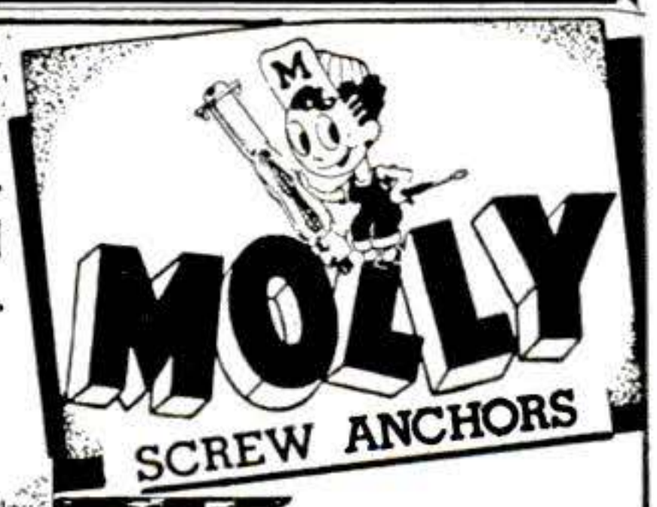
WELLWORTH TRADING CO.

Merged with C & M Equipment Co.
1831 S. STATE ST., DEPT. B-5, CHICAGO 16, ILL.



WITH MOLLY YOU CAN FASTEN ANYTHING and do it quickly, neatly and safely. MOLLY will hold fixtures securely to floors, ceilings or any hollow wall construction... Simple to install, all you need is a screw driver. Sold by leading hardware stores everywhere.

Write for Free Descriptive Folder

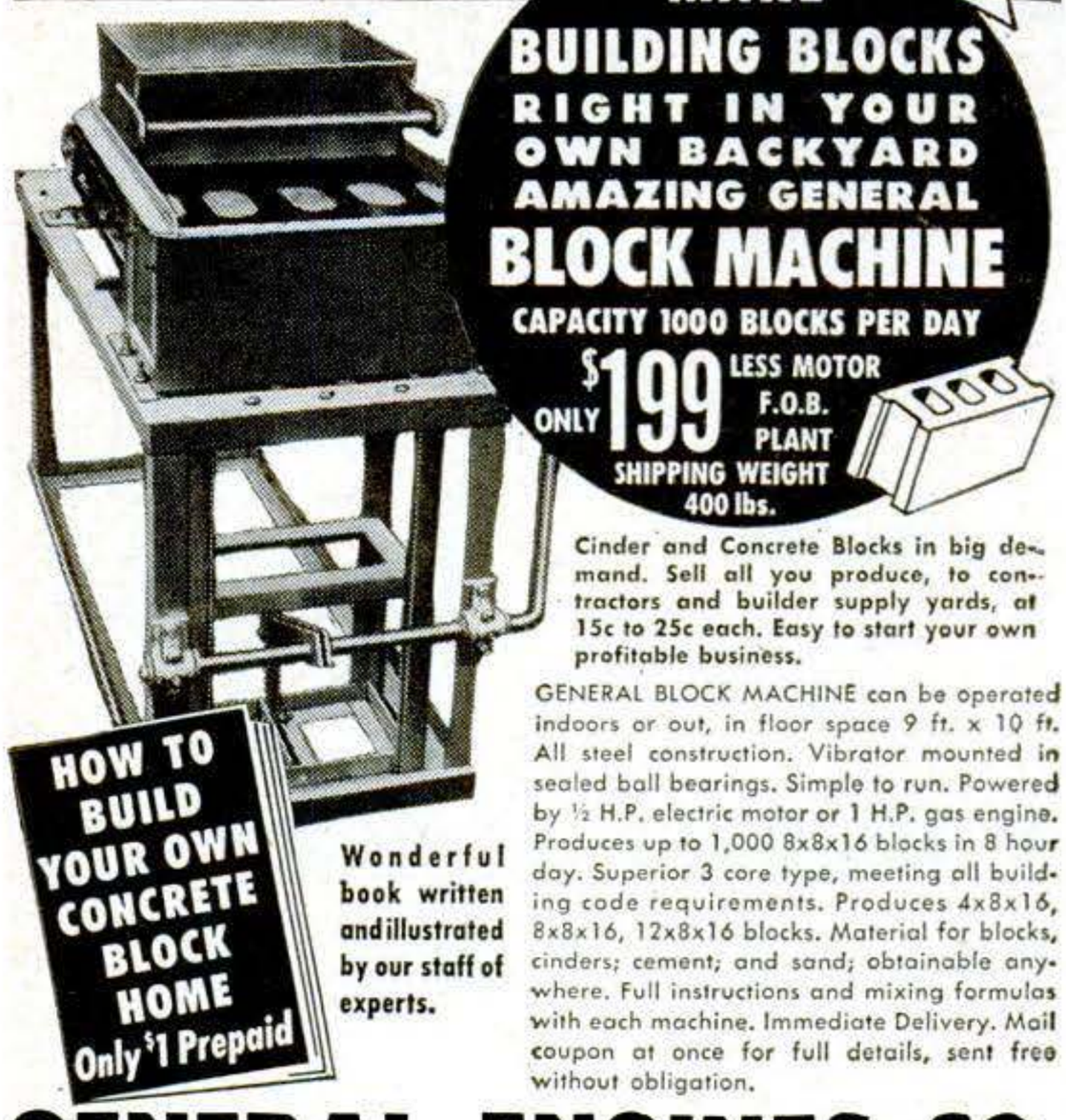


WHERE SCREWS WON'T HOLD!
...USE MOLLYS...

MOLLY CORPORATION 522 COURT ST. READING, PA.

Copyrighted material

CASH IN ON THE BUILDING BOOM!



Cinder and Concrete Blocks in big demand. Sell all you produce, to contractors and builder supply yards, at 15c to 25c each. Easy to start your own profitable business.

GENERAL BLOCK MACHINE can be operated indoors or out, in floor space 9 ft. x 10 ft. All steel construction. Vibrator mounted in sealed ball bearings. Simple to run. Powered by ½ H.P. electric motor or 1 H.P. gas engine. Produces up to 1,000 8x8x16 blocks in 8 hour day. Superior 3 core type, meeting all building code requirements. Produces 4x8x16, 8x8x16, 12x8x16 blocks. Material for blocks, cinders; cement; and sand; obtainable anywhere. Full instructions and mixing formulas with each machine. Immediate Delivery. Mail coupon at once for full details, sent free without obligation.

Wonderful book written and illustrated by our staff of experts.

GENERAL ENGINES CO.
(EASTERN DIVISION) DEPT. S-C—DREXEL BLDG., PHILA. 6, PA.

Shows you 8 ways to save money and how to make and lay blocks, laying out building lines, mixing your own concrete, building steps, porches and concrete floors. Includes floor plans for 6 beautiful easy to construct concrete block bungalows. Mail coupon at once with $1.

Name .....
Address .....
City..... Zone... State.....

Barron PRECISION BUILT DRILL PRESS TOOLS!

15 Essential workshop operations now accomplished on any drill press with famous Barron Tools and Accessories . . . Planing, mortising, rabbeting, shaping, surface sanding, polishing, tenoning, grooving, routing, drum sanding, beading, paneling, veining, edging, molding, dovetailing, etc.

FREE! Workshop Guide

Including a complete catalog of time-proved, precision built Barron Workshop Tools. Convert ANY drill press into your most versatile, low cost power tool.

FULL 10 DAY MONEY BACK GUARANTEE

BARRON TOOL CO., INC.
770 ARCHITECTS BLDG. DETROIT 1, MICH.

NEW *Pocket* MICROSCOPE

3 different magnifications. 20, 40 and 60 power, instantly, at the flick of a finger. Ring type fine focusing control.

High accuracy—for use in factory, show-room, field. Requires no slides, no pre-arranged conditions, no special light source. **A compound microscope** with **precision ground** and **polished lenses, hard-coated** to admit more light, reduce glare and eliminate reflection. **Full, flat field of vision.** 5¼" long (closed), weight 3 oz. Lifetime **baked enamel** and **triple-chrome plated finish.** Handsome case included. Order now. **POSTPAID $14.50**

SCHOENIG & CO., Inc.
Dept. 5PS, 9 Rockefeller Plaza, New York 20, N. Y.

SHOP SMITH REG. TRADE MARK

SEND FOR FREE FOLDER

MULTI PURPOSE POWER TOOL

Magna Engineering Corporation
465 California St., San Francisco 4

PAINTERS' STRIPING TOOL

A TOOL... NOT A BRUSH

NEW, IMPROVED

Modern—streamlined—fits the hand like a fountain pen! Easy to use as a pencil. Draws parallel lines—straight, curve or circular. Does expert job on autos, furniture, toys, bikes, model planes, signs, bulletins, linoleum. (Makes wall board look like tile.) Every painter and craftsman needs one! Type "M" MASTER Painters' Striping Tool complete with tip for 1/16" stripe. $1.00. Tool with choice of 1/64", 1/32", 3/64", 5/64" 3/32", ⅛" tip—$1.50 . . . all tips 75c ea. Tool with complete set of 7 tips $5.00. (COD's postage collect) Paint dealers, write!

$1.00 POST PAID

EASY AS USING A PENCIL!

WENDELL MFG. CO.
4234-A Lincoln Ave., Chicago 18, Illinois

"SAVE IT AND FIX IT"

MENDS

DISHES, FURNITURE, LUGGAGE

It's transparent, waterproof, flexible and durable. Get a tube today.

DU PONT
REG. U. S. PAT. OFF.

DUCO CEMENT

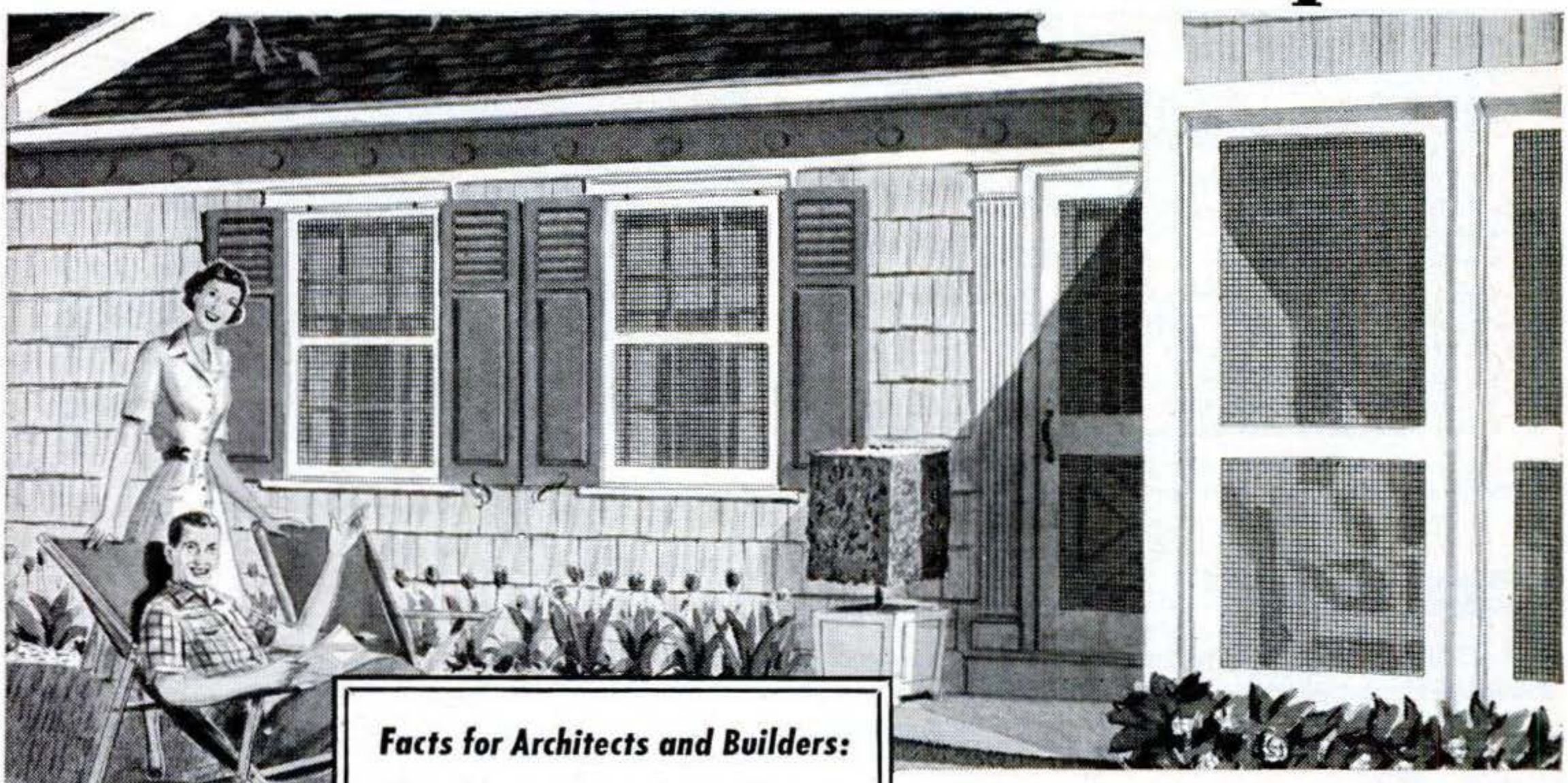
REG. U. S. PAT. OFF.

Copyrighted material

Amazing new LUMITE *screening*

STAINPROOF

Because it's Rustproof!



LONGER-LASTING

CAN'T STAIN YOUR HOUSE!

CAN'T RUST OR CORRODE

Facts for Architects and Builders:

Effect of acids, alkalis and solvents—Essentially none.

Effect of age—Independent scientific tests indicate that LUMITE is more durable than any other type of screen cloth under all climatic conditions that might normally be encountered.

Non-inflammable—Will not support flame . . . is self-extinguishing. Melting point, 340°F.

Tensile strength—Up to 40,000 lbs. per square inch.

Impact strength—Greater than conventional screening.

Installation—Cut with ordinary scissors. Fold cut edges under one-half inch. Tack or staple the screening smoothly and evenly every 1½". Because of inherent characteristics LUMITE will gradually draw itself into a snug, firm fit. For correct methods of machine framing, consult LUMITE engineers.

Imagine a screening that can be GUARANTEED never to rust, rot, corrode or stain your house—yet costs only 11½-12¢ per square foot. That's LUMITE!

Imagine a plastic so strong that it actually has greater impact strength than any other type of screening. That's LUMITE!

Imagine a screening that never needs painting to protect it from rust or corrosion. That's LUMITE!

Imagine a screening that is so easy to handle anyone can frame it—no special tools needed—will never sag or bulge when properly framed. That's LUMITE!

For your new home or to replace old screens, order LUMITE from your hardware, lumber or building supply dealer.

Write for information and free sample to Dept. PS-2, LUMITE DIVISION, Chicopee Manufacturing Corporation, 47 Worth Street, New York 13, N. Y.

*Registered Trade-mark

INSIST ON RUSTPROOF SCREENING

LUMITE

woven saran screening

Guaranteed by Good Housekeeping

Copyrighted material

A *SENSATION* with CRAFTSMEN EVERYWHERE!

THIS AMAZING, NEW, LOW-PRICED *OSCILLATING, SANDER AND POLISHER!*

$14.95 DU-FAST ATTACHMENT* ONLY

CRAFTSMEN! **Here's the new, versatile, OSCILLATING Sander and Polisher . . . the perfect attachment for every HOME UTILITY ¼" Electric Drill and HOME UTILITY 5" Disc Sander-Polisher.**

Now, in a traction of the time, and with far less "elbow grease", the **DU-FAST SANDER AND POLISHER*** ***gives you certain, superior finishes every time . . .*** **plus a definite saving in time and money!**

- **ATTACHED AND DETACHED IN A JIFFY**
- **WEIGHS ONLY 5 LBS. (with drill) — ELIMINATES FATIGUE**
- **EASY TO USE IN CORNERS, ON OPEN STOCK, AND ON CURVED SURFACES**

If you use a B & D Home Utility ¼" drill . . you'll want the Du-Fast Oscillating Sander and Polisher attachment. In any case, don't fail to see it and try it at any hardware dealer who carries B & D Home Utility Tools.

*PAT. APPLIED FOR

MANUFACTURED BY
DU-FAST, inc.
32 EAST FOURTH STREET, NEW YORK 3, N. Y.

Available only at hardware dealers carrying Black & Decker Home Utility Tools. *Stop at one today!*

IT'S EASY TO *"Trim-it-Yourself"* with
CHROMTRIM METAL MOULDINGS

The perfected metal trim for wall or floor linoleum and building materials. 6' lengths, 8 shapes, easy to cut and apply.

Send 10c for "Trim Ideas" 16 page booklet. Over 30 projects and remodelling suggestions on where and how to use CHROMTRIM. Hints on lino-laying.

REMODEL KITCHEN BATH • ATTIC

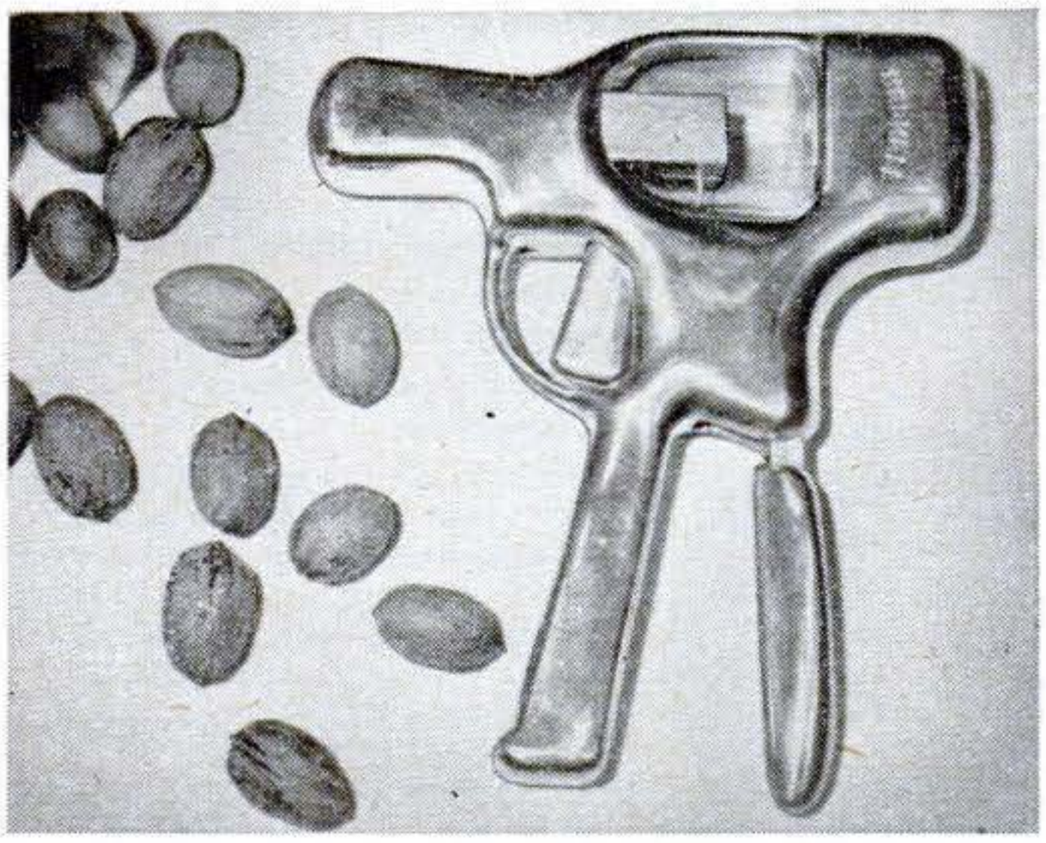
MAKE METAL PROJECTS with CHROMTRIM

R. D. Werner Co., 291 Fifth Ave., N.Y. 16
Enclosed is 10c for CHROMTRIM "Trim Ideas" booklet P
Name_____
Address_____
City_____ **Zone**_____ **State**_____

CURIOUS about the NEW
FLUID LINOLEUM TILE STONE
Write to PAVINOLEUM, INC.
342 Madison Ave., New York 17, N. Y.
Enclose 12c in stamps for color booklet

Aids to

Cups Clipped in Rack. Each of these plastic racks holds four cups and can be installed at any angle under a shelf, on a cupboard door, wall, or in a drawer. To insert cups, roll them over and around the circle until the base of the cup clips into place. The maker, Leipzig and Lippe, Inc., New York City, prices the racks at $1.

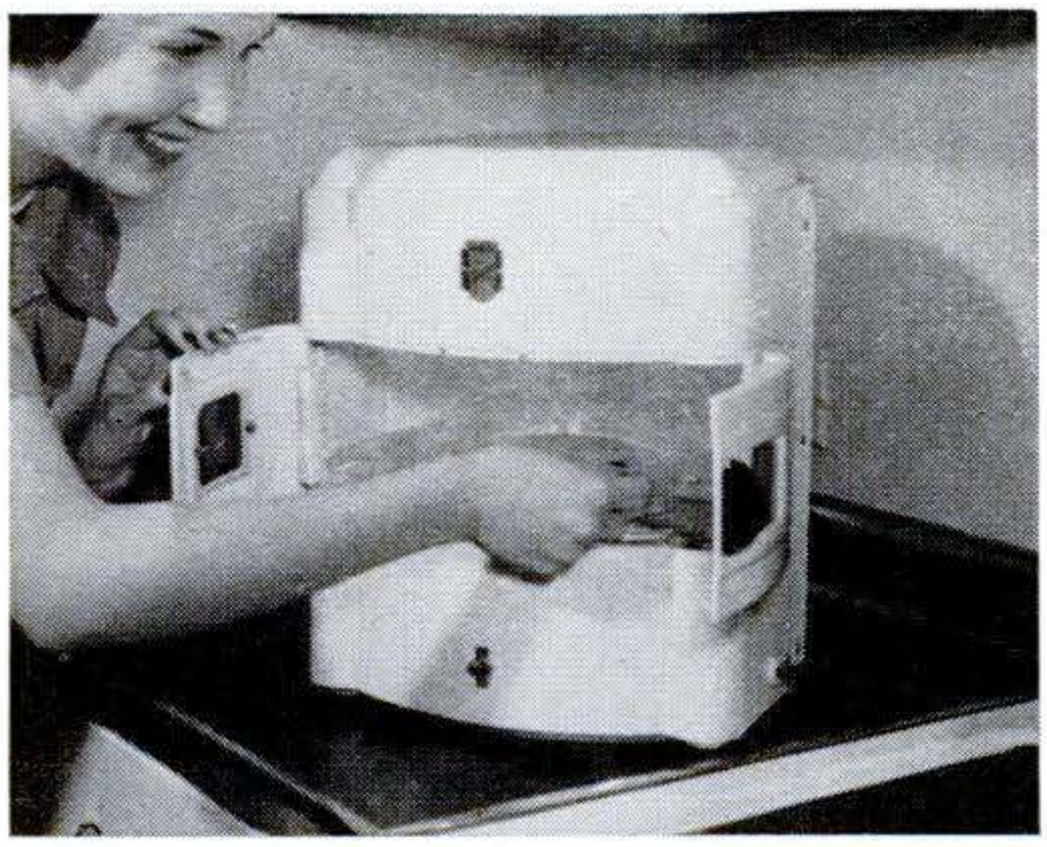


Nutcracker Is Pistol Shaped. While this cracker handles all kinds of nuts, it is mainly designed for pecans, permitting the meat to be extracted whole. Pulling the trigger moves the front cracking cup forward. The nut is inserted and the handles squeezed to crack it. The device is made of aluminum die castings by the John W. Clark Industries, of San Marcos, Tex. It retails for about $4.

Copyrighted material

Modern Living

Baby Carriage Climbs Stairs. Almost every mother knows the difficulty of getting a baby carriage up and down stairs and curbs. This carriage, a new British product, licks the problem with the six small wheels—three on each side—at the rear. Each of the small wheels revolves on its own axle and each set turns on a common axle.



Infrared Rays Cook Food. Another push-button kitchen aid is this cooker that fries, broils, or bakes with heat from two infrared lamps. Two lamps, one above and the other below, are focused on a transparent food tray. In photo, piece of meat wrapped in plastic is being placed on the tray. Steaks can be prepared in from one and a half to six minutes. The Dorby Co., Chicago, prices it about $42.

For Your
AUTO
HOME
BOAT

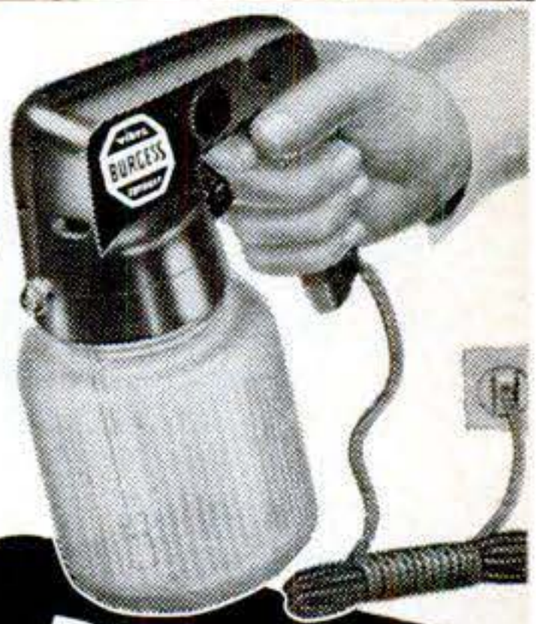
©SPRAZIT
FIRE EXTINGUISHER

$1.49
3 for
$4.35

Don't take chances with fire! Keep one of these economical SPRAZIT* Fire Extinguishers handy in the glove compartment of your auto...in every room of the house...in your boat...wherever fire may strike. This low-cost fire protection requires no periodic inspections or refilling. SPRAZIT* is a compact, efficient fire fighter...contains 16 full ounces of smothering, non-damaging fluid! SPRAZIT* will instantly put out almost any type of fire. Get SPRAZIT* today! If your dealer cannot supply you MAIL THIS COUPON.
*Copyright 1948

PLASTI-KOTE, INC., 425 Lakeside Ave., N.W., Cleveland, Ohio
Please send me SPRAZIT* Fire Extinguishers as checked below:
( ) 1 SPRAZIT* Extinguisher at $1.49
( ) 3 SPRAZIT* Extinguishers at $4.35
( ) Send C.O.D. plus postage, I will pay postman.
( ) I enclose payment. Sent postpaid.
( ) Send catalog and price list explaining the complete SPRAZIT* packaged power line—Plastic Spray, Air Conditioner, Insect Killer, Moth Proofer and Auto and Furniture Wax
Name.....
Address.....
City.....Zone.....State.....

new
low-priced
electric
paint sprayer



Only
$12.95
Complete

for utility
painting of tables—
chairs—screens—
floors—clothes hampers—
car fenders—toys

BURGESS
vibro-sprayer
Pat. Applied For
Just Plug Into Any 110 Volt
A.C. Socket and Spray

Built-In-Head Motor and Compressor Unit

Now! An electric sprayer as easy to handle as a brush—and twice as fast! Sprays household enamel, lacquer, varnish, shellac, light oils and insecticides. No extras to buy! 25 oz. jar. 8 ft. cord. Mail the coupon for full information.

vibro BURGESS sprayer

BURGESS BATTERY COMPANY, Handicraft Division
162 Rand Road, Lake Zurich, Illinois
Please send FREE 12-page instruction booklet and illustrated circular in color describing the New Burgess Vibro-Sprayer.
Your Name_____
Street Address_____
City_____Zone____State_____

Copyrighted material

SO HANDY FOR SO MANY USES

AT HOME
OFFICE AND SHOP

32 DRAWER MODEL PICTURED ONLY $5.95 POST PAID

THE JIFFY METAL CABINET

NOW you can keep nuts, bolts, screws, nails, parts, washers, stamps, hobbyist needs, etc., at your fingertips.

Just think, 32 or 64 drawer cabinet to keep those small items that usually get mislaid. Spot welded steel cabinet, enamel finish, metal drawer guides. Looks good anywhere. Send check or money order please—no C.O.D.'s. Prices below. Your money refunded if not satisfied.

SPECIFICATIONS	WITH ALUMINUM DRAWERS	WITH CARDBOARD DRAWERS
32 Drawer Unit 6" Deep 12¾" Wide 15¼" High	One piece rustproof aluminum drawers for heavy service — good for work bench and industry use.	Suitable for most home uses. Heavy board kraft covered. Metal drawer pulls.
64 Drawer Unit 6" Deep 25½" Wide 15¼" High	32 drw. $8.95	32 drw. $5.95
Drawer Size 1¼" Deep 2¾" Wide 6" Long	64 drw. $15.95	64 drw. $9.95
	POSTAGE PAID	POSTAGE PAID

KAYTEE PRODUCTS DEPT. S BOX 588, CANTON, O.

Now I remove paint the EASY WAY!

Homemakers everywhere are discovering what painters have known for years—that Wonder-Paste does a quicker, cleaner removing job every time!

WONDER-PASTE

Applied directly over the old finish, Wonder-Paste penetrates right through to the surface. Reduces the toughest finish to an unresisting sludge that peels off like putty! Leaves surface clean and smooth—with no sanding needed.

Get Wonder-Paste at your paint or hardware store. *Write us for Wonder-Paste leaflet* and for information about your removing problem.

WILSON-IMPERIAL COMPANY
121 Chestnut Street, Newark 5, N. J.

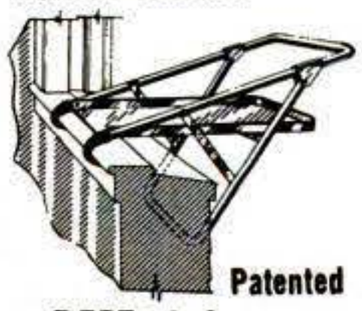
LOOK!
WASH YOUR WINDOWS THIS SAFEWAY
USE THE SAFETY WINDOW SEAT

SEND FOR ONE TODAY

ONLY $11.95 POSTPAID $12.45 WEST of ROCKIES
NO C. O. D.
10 DAY MONEY BACK GUARANTEE

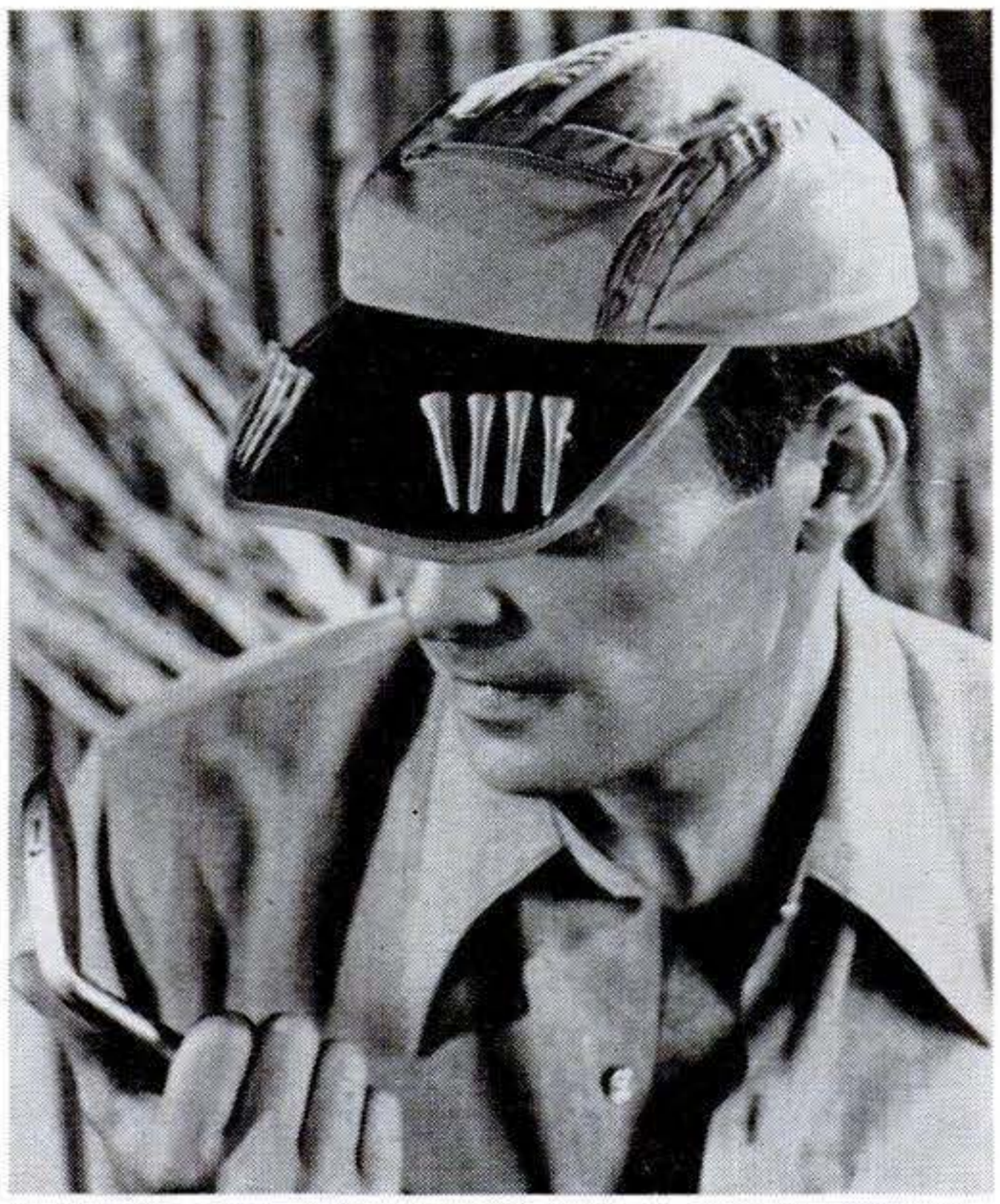
THE FAVRE MANUFACTURING CO.
183 WESTON ST. WALTHAM 54, MASS.
DESCRIPTIVE FOLDER ON REQUEST

Agents Wanted

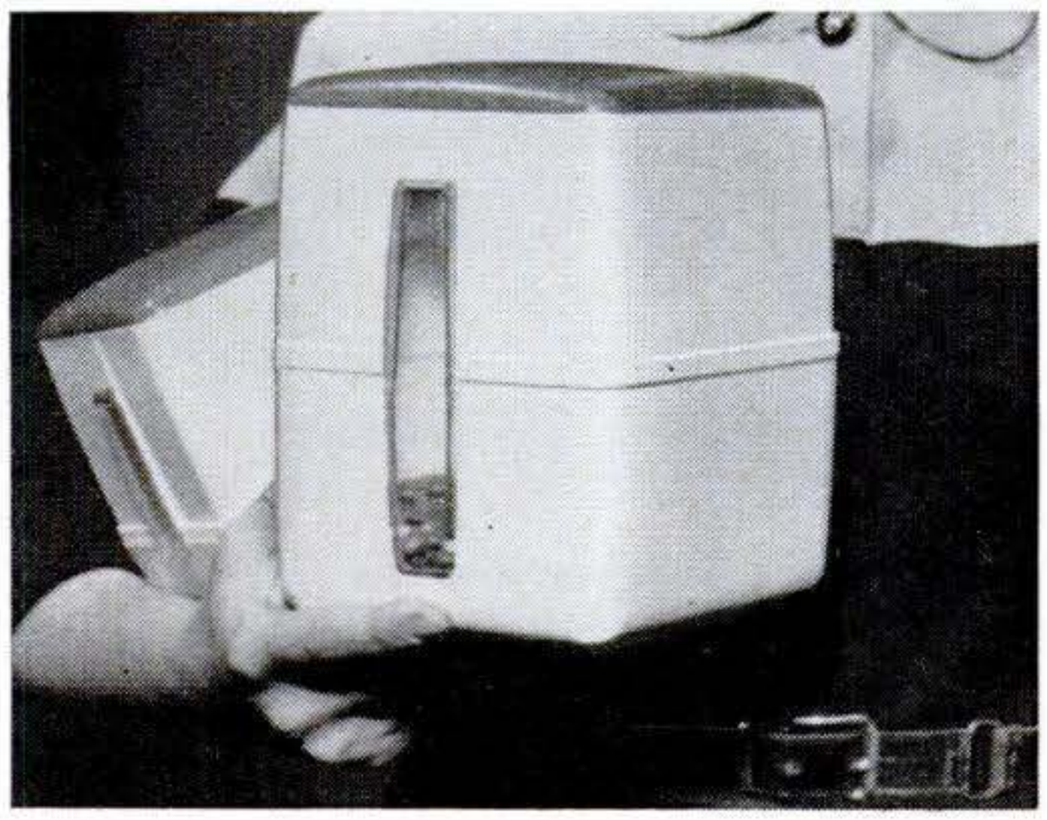


Patented
DEPT. A-3

Aids to Modern Living



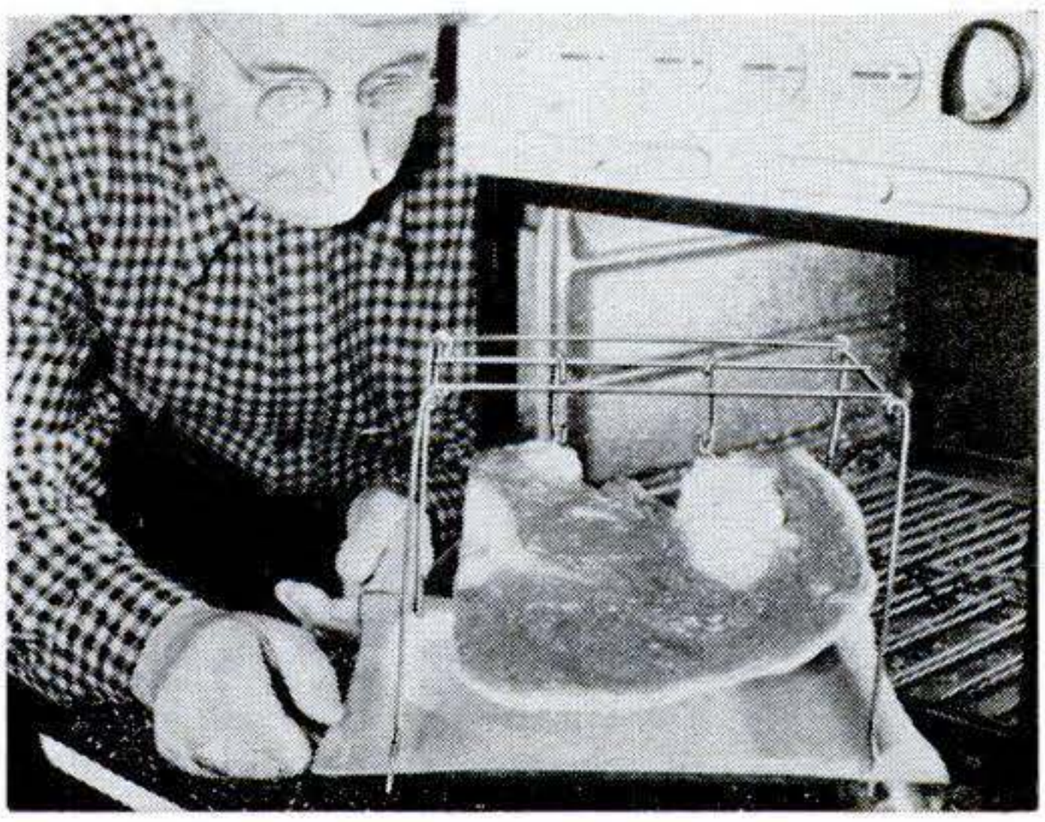
Sports Cap Has Zipper Pocket. A zipper pocket and loops on the visor for golf tees or fishing flies are features of this sports cap made by Westbrook Hats, Inc., New York City. The Vinylite ® visor is forest green and is also available without the loops. On the beach, the cap pocket can be used to carry a watch, cash, a few cigarettes and matches, or a bath-locker key. Price is about $2.50.



Windowed Canisters. A glance at these canisters tells a housewife how much sugar, rice, flour, or dried food she has on hand. The all-plastic containers are made by Canistor, Inc., of Racine, Wis.

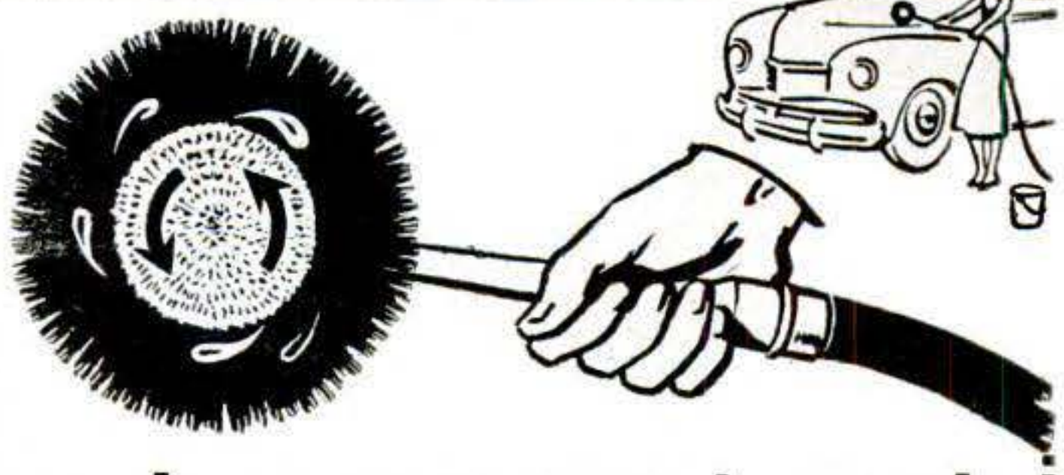
Copyrighted material

Ironing Board Is Adjustable. The Met-L-Top® ironing table has seven height adjustments from 31½" to 35½" to suit women of different heights. Other features include a white enameled top that is perforated, allowing steam to pass through it. Each of the legs has a telescoping section held by a thumbscrew. Legs are marked for equal adjustment. It's priced about $11 by Geuder, Paeschke & Frey Co., Milwaukee.



Cooker Retains Moisture. Two hooks on the rack hold meat, poultry, or fish off the pan to cook while retaining their moisture and vitamin content, according to the inventor, R. F. Tibbetts, Los Angeles.

NEVER BEFORE!



such an easy way to wash your car!

Just hold the SWIRL-O-MATIC

The Revolving Brush Does the Work!

"Does so much for so little." Simply attach SWIRL-O-MATIC to any garden hose . . . the amazing turbine-action of the inner brush plus "magic" detergent quickly cleans, gives car a gleaming jewel finish. The outer brush gets into corners, prevents splashing. (Brushes are replaceable.)

- Rinses as it cleans! No streaking!
- No rubbing, scrubbing, wiping!
- Washes screens, windows, etc.
- Easy to use...weighs less than 1 lb.
- Guaranteed! Economical! Pays for itself in 5 or 6 washings.
- Free! Special washing detergent.

ONLY $6.95 PREPAID

ALL-AROUND CLEANING! Get ready—order Swirl-O-Matic now to clean up and store storm windows, clean screens, windows, etc. Order 3 ft. extension ideal for this purpose. $2.50 extra (Prepaid).
West of Mississippi: add 25c each item. Agents Wanted

MELAIRE DISTRIBUTING CO.
Dept. PS1, 420 Lexington Ave., New York 17, N. Y.

A must tool for electricians, maintenance men, home owners. Replaceable lamp inside Plier tests 110 to 600 Volts. Plier pulls fuses from 10 to 100 Amperes. Shockproof. Requires the use of only one hand. Can be obtained from General Electric or Westinghouse stores, local electric dealers or direct from us, postpaid.

Price $2.75 without Leads, $1.50 additional for Leads. Order TODAY.
STAR FUSE CO., 237 Canal St., New York 13, N. Y.

NEW! AMAZING!

SPRA-IT-ON-® Self Spraying PAINTS!

IMAGINE!

Spray – paint ENAMELS – simply open the pat. valve – that's all, no brush, no compressor, no mixing, no muss or extra equipment. Spray direct from PRESSURE PACKED container–so simple an amateur gets professional results every time. Choice of 20 COLORFUL and protective sprays. Hundreds of uses . . home, auto, boat, farm. Economical too . . only $2.95. At paint, hardware, auto and department stores.

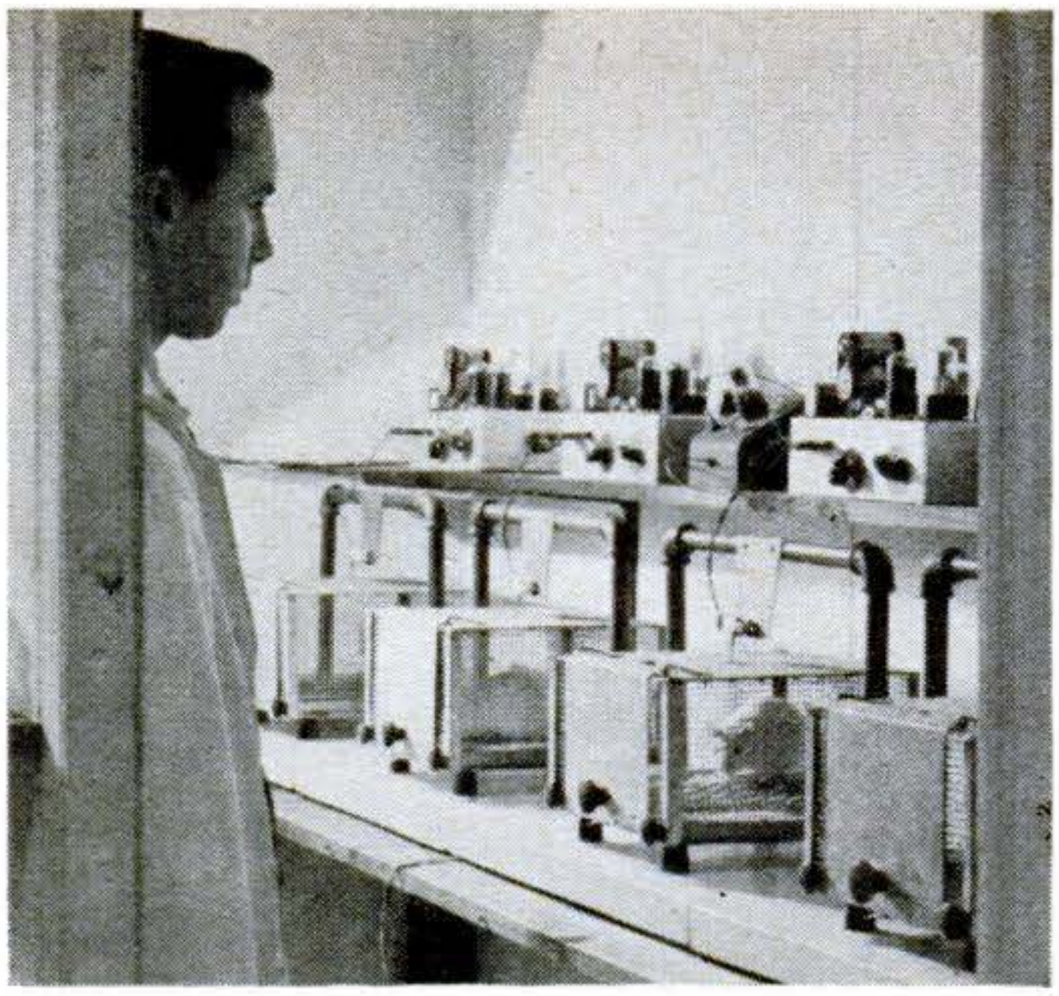
Write for color chart.

SPRAYON, © INC. 1360 W. 9th St. Cleveland, Ohio

Copyrighted material

TO: Reader
FROM: Editor

Prescribe TV For Your M.D.



Four rats watched by 1,000 doctors.

PS EDITORS disregard many predictions—often they cannot be proved true or false for a long time—but pass on to you those that seem most plausible and interesting. In February, 1947, we reported Dr. Vladimir K. Zworykin's prophecy that television might change one's whole concept of educational techniques, especially in medicine. We thought then of the need for more doctors and hoped it might make larger classes possible in the medical schools. That seems less likely now, but TV has turned out to be an extremely valuable means of keeping doctors up to date after they leave school.

With nearly 1,000 doctors, I looked over the shoulder of Dr. Edwin J. Fellows this spring while he demonstrated the effects of some new drugs in the Smith, Kline & French laboratories in Philadelphia. Only a few men could have crowded around Dr. Fellows' animals and apparatus, but three television screens—each one as big as a bedsheet—enabled an auditorium full of doctors to study his work.

First he injected a chemical compound intended to relieve nasal congestion into an anesthetized cat. The cat's reactions showed its systemic, or over-all, effects. Then he permitted an anesthetized dog to breathe the stuff, and measured the changes within the dog's nose electrically by means of two electrodes taped to the dog's head.

To show a drug's effects on activity, Dr. Fellows used four rats. He placed each one in a cage mounted on sponge rubber and so arranged that every little movement of the rat increased the charge in an electrical condenser. The condensers then guided four pencils that recorded the rats' friskiness.

A third experiment was performed with two rabbits. Each was suspended in a cradle and given an electric shock. One rabbit's convulsion lasted longer and was followed by more rigidity than that of the other rabbit. The latter had been given a drug that may help victims of epilepsy.

One of the physicians fascinated by the TV view of this research told me afterwards that he had learned more by "making the rounds" of patients in a hospital with a professor than in any other way. He then pointed out that a TV camera also can follow a great doctor on his rounds and show many other doctors what he does. This, too, has been done.

Next month, 12,000 doctors at the American Medical Association meeting in Atlantic City will be shown TV close-ups of the hands of University of Pennsylvania surgeons at work in their operating rooms. Color television is to be used then.

Dr. Morris Fishbein of the AMA calls the electric light the greatest invention in medicine because it enables doctors to see into the body's openings. By also helping them peer into the laboratories of pharmaceutical pioneers, the clinics of specialists, and the incisions of successful surgeons, TV is now showing the doctors what it's best to do about the troubles they discover with their many little electric lights.

Volta Torrey

Copyrighted material

Car Painting is Easy!

with this
COMPLETE Auto Painting Kit
that Really Works!

ONLY $9.95

EVERYTHING YOU NEED
FOR A FINISH THAT LOOKS AND WEARS LIKE A *PROFESSIONAL SPRAY JOB*

Enough Pad-O'-Paint for any car
Smooth-It-On Mitt • Paint-Saver Tray
Sandpaper (2 grades) • Lint Remover
Utility Cloth • Solvent Cleaner
Plastic Filler • Spatula • Small Brush

THE MITT THAT MAKES CAR PAINTING EASY!

Pad-O'-Paint

IS FINEST AUTO ENAMEL

Goes on perfectly over any other color, lacquer or enamel. Gives that brilliant, glossy new car look. Your choice of the most popular automotive colors.

TESTED AND APPROVED BY 2 GREAT LABORATORIES AND OVER 100,000 USERS

The Arco Research Laboratories and a nationally known product testing laboratory give Pad-O'-Paint highest rating. But even greater endorsement is the satisfaction of over 100,000 car owners, many of whom Pad-O'-Painted their cars more than two years ago.

A PRODUCT OF
THE ARCO CO.
Cleveland, Ohio

68 YEARS EXPERIENCE MAKING FINEST TRANSPORTATION ENAMELS

TESTED AND APPROVED BY 2 GREAT LABORATORIES

Dries Dust-Free In Minutes!
Completely Dry In a Few Hours!

The patented Smooth-It-On Mitt makes you an expert car painter...no lap marks, no streaks. Your car will have a finish that looks like a million... yet costs only $9.95,

Buy your kit today! **AUTO ACCESSORIES DEPT.**
ALL SEARS, ROEBUCK AND CO. STORES

Pad-O'-Paint

© Pad-O'-Paint and Smooth-It-On Mitt are trademarks of The Arco Company, Cleveland, O. Pats. Pend.

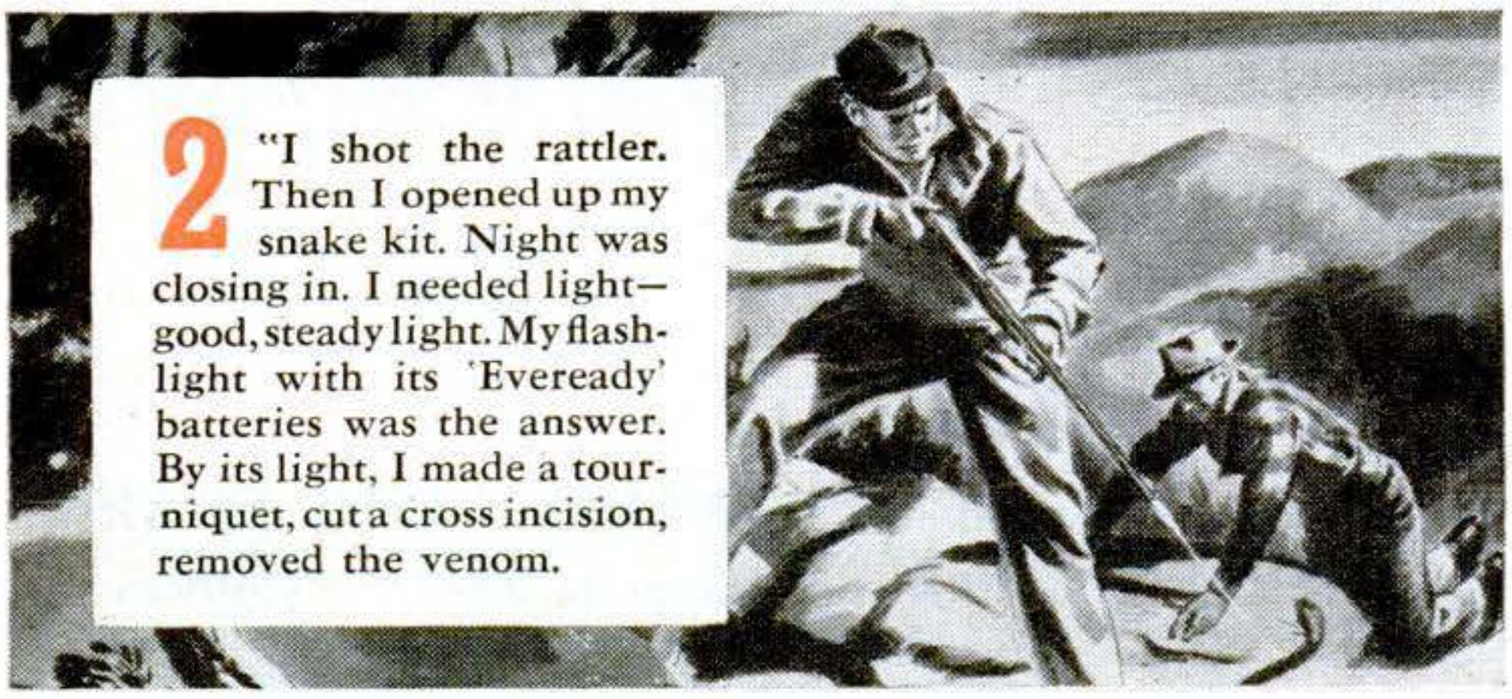
A reprint of an interesting national magazine article on Pad-O'-Paint is yours for the asking. Write The Arco Company, 7301 Bessemer Avenue, Cleveland 4, Ohio.

Copyrighted material

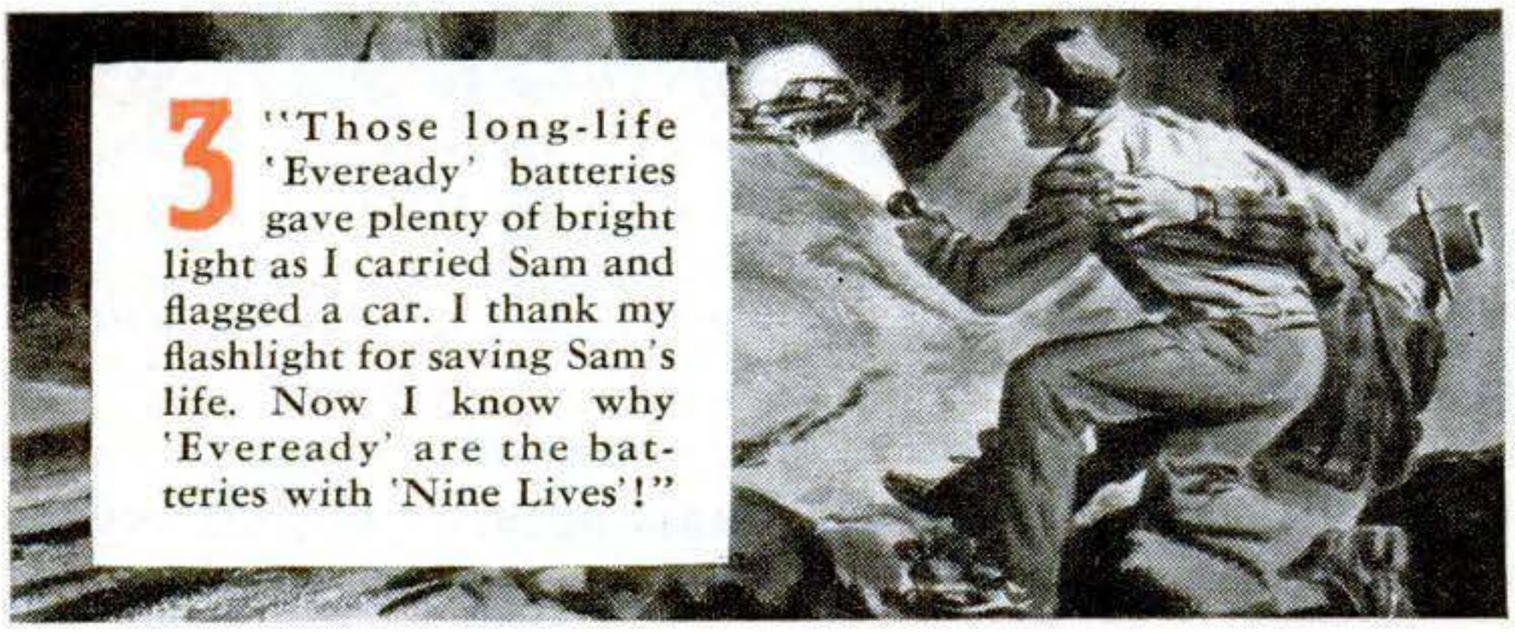
"My race for life against a Rattler's Poison!"

A true experience of WILLIAM F. COLLEY San Diego, Calif.

1 "A piercing shriek cut the silence as I lay in wait for deer in the Laguna Mountains near San Diego. I dashed to Sam Reardon, my hunting companion. A 3½-foot rattler had dug his fangs into Sam's ankle! Twice in my own life, I'd felt the rattler's sting. I knew what to do.



2 "I shot the rattler. Then I opened up my snake kit. Night was closing in. I needed light—good, steady light. My flashlight with its 'Eveready' batteries was the answer. By its light, I made a tourniquet, cut a cross incision, removed the venom.



3 "Those long-life 'Eveready' batteries gave plenty of bright light as I carried Sam and flagged a car. I thank my flashlight for saving Sam's life. Now I know why 'Eveready' are the batteries with 'Nine Lives'!"

Just as an active cat ...takes a cat nap... and *bounces back* with new pep ...so "Eveready" flashlight batteries recover power between uses and *bounce back* for *extra life!*

THE FLASHLIGHT BATTERY WITH "NINE 9 LIVES"!

"Eveready," "Nine Lives," and the cat symbol are trade-marks of
NATIONAL CARBON COMPANY, INC.
30 East 42nd Street, New York 17, N. Y.
Unit of Union Carbide UCC *and Carbon Corporation*

Copyrighted material

Amazing New LOW PRICED Electric Spra
For Home Use Makes Painting Ea

OUSEHOLD ITEMS—It's easy to paint lothes hampers, kitchen chairs, shelv-ng, partitions, slat fences, metal trash ums, etc., with Vibro-Sprayer!

TDOOR FURNITURE—Just the thing painting rustic chairs, reed furni-e, brickwork, boats, wagons, and ner equipment!

OUGH SURFACES—Makes quick work painting concrete, rough wood or ndow screening!

ECT CONTROL—Efficiently aids ex-nination of roaches, waterbugs, , mosquitoes and other pests. Fine mothproofing clothes!

TOMOBILE MAINTENANCE—Pro-es the answer to quick, smooth h-up work on fenders and body. ys light oils for under-chassis lu-tion.

EN PEST CONTROL—Ideal for ng insecticides and fungicides on s, plants and shrubs.

SAVE MONEY, TIME, WORK! GET PROFESSIONAL RESULT

- Paint Floors, Ceilings, Walls, Woodwork, Furniture, Toys
- Enamel Auto Bodies and Fenders, Storm Windows, Screens
- Varnish Table Tops, Linoleum
- Spray Moth-Proofing Liquids in Closets and Attics
- Spray Flit or Other Insect and Pest Solutions
- Spray Insecticides on Flowers, Plants, Shrubs
- USE VIBRO SPRAYER for EVERY Job of Painting and Spraying in and Around the Home
- Self-Contained Unit — No Motor, No Compressor, Produces Equivalent of 30 lbs. Pressure!

TRY IT 10 DAYS FREE IN YOUR OWN HOME!

Yes, now you can do a *professional painting* job on everything in and around your house with this amazing, brand new, self-contained electric paint sprayer. Just fill the big, 25-ounce capacity, interchangeable mason jar with any kind of ordinary oilbase liquid—lacquer, glossy paint, enamel, varnish, shellac, residual type insecticides, light oils, moth sprays, disinfectants, etc. Then plug the 8-ft. insulated cord into any 110-volt A.C. household outlet—pull the trigger—and get satin-smooth, professional results *every time!*

SAVE MONEY. TIME AND WORK

VIBRO-SPRAYER paints twice as fast as a brush, saves strain, fatigue, backache and sore muscles. Paint goes on FASTER, SMOOTHER and far more EASILY than with a brush. Adjustable spray control allows wide or narrow spray, thick or fine, as the job requires. Spray radius is always under complete control. VIBRO-SPRAYER cannot clog or drip—and is amazingly simple to clean. What's more, VIBRO-SPRAYER is SAFE! Will never break in use as there is NO pressure in the jar.

COSTS LESS THAN A SET OF GOOD BRUSHES

Not only does VIBRO-SPRAYER paint faster, smoother, more easily, but it actually costs less! And because VIBRO-SPRAYER applies paint more evenly and uniformly, you use LESS PAINT—save the cost of the sprayer in just a few months! In addition, VIBRO-SPRAYER shoots a fine, even spray into deep crevices where ordinary paint brushes can't reach, makes short work of rough surfaces that are so difficult to brush.

MADE BY A FAMOUS COMPANY

VIBRO-SPRAYER is manufactured by the world-famous Burgess Battery Company, makers of popular auto and flashlight batteries. Every VIBRO-SPRAYER is guaranteed by the manufacturer to be free of mechanical defects. In addition, we guarantee that VIBRO-SPRAYER will give you exactly the professional, fast, labor and money saving results you desire, or you may return your sprayer within 10 days for full purchase price refund. You get FULL PROTECTION under this DOUBLE GUARANTEE!

SEND NO MONEY

Send only the coupon, now. When your VIBRO-SPRAYER arrives, pay the postman only $12.95 plus small delivery charge—or enclose full payment now and we pay all delivery charges. In either case you are fully protected by the manufacturer's guarantee of mechanical perfection, and our guarantee of complete satisfaction, or return your VIBRO-SPRAYER within 10 days for full purchase price refund. Send the coupon AT ONCE!

Comes Complete-All Ready to Use-No Extras to Buy!

ONLY **$12.95**

VIBRO-SPRAYER is completely self-contained—the ONLY unit of its kind on the market. Nothing else to buy, no hose, compressor, motor, tank, etc. Just pour liquid into paint jar, (25 ounce capacity) plug in and press the trigger! Size 8⅜" high, 6½" deep, 4" wide. Works on activated piston and suction principle. Built like professional equipment—does work of a $100.00 unit producing 30 lbs. pressure!

MAIL THIS CARD NOW!

FOSTER PRODUCTS, INC., DEPT. SG 99, 179 WOOSTER STREET, NEW YORK 12, N. Y.

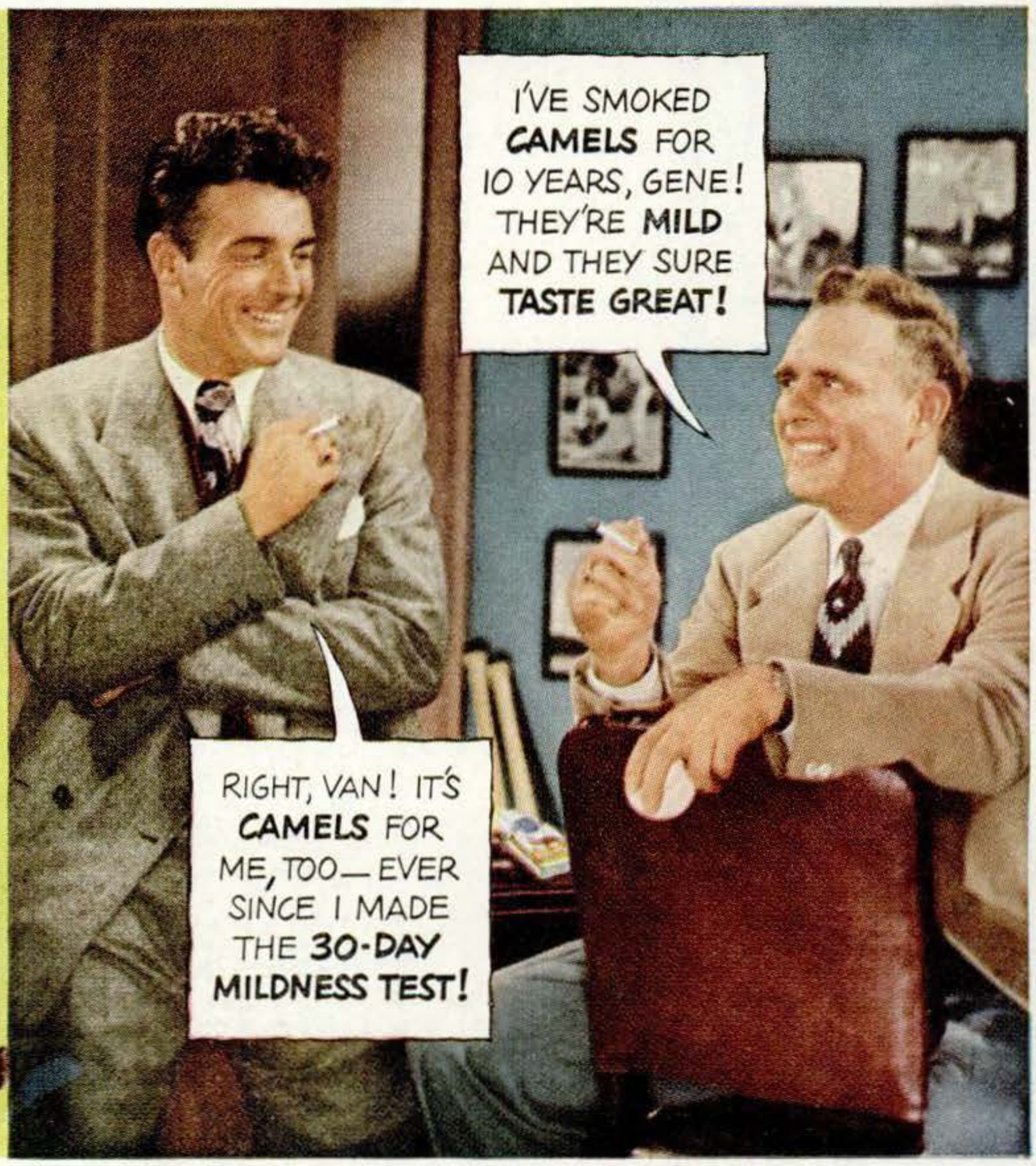
Camels FOR MILDNESS!

Gene Bearden

Voted the "Rookie of the Year" in the American League with an earned run average of 2.43, Gene was the pitching hero of the '48 World Series . . . stepping out on the mound to wrap up two big climax games for the Cleveland Indians.

Johnny Vander Meer

He has more strikeouts to his record than any other pitcher on the Cincinnati Reds. Vander Meer is the only big leaguer to ever pitch two "no-hit" games —in a row.



In a recent test of hundreds of people who smoked only Camels for 30 days, noted throat specialists, making weekly examinations, reported

NOT ONE SINGLE CASE OF THROAT IRRITATION due to smoking CAMELS

• Have YOU made the Camel 30-Day Test? The doctors' findings in the recent coast-to-coast test of Camel mildness speak for themselves. But why not make your own personal 30-day test of Camel Mildness?

Yes, smoke Camels and test them in your "T-Zone". Let your taste tell you about the rich flavor of Camel's choice tobaccos. Let your throat report on Camel mildness.

Money-Back Guarantee!

Try Camels and test them as you smoke them. If, at any time, you are not convinced that Camels are the mildest cigarette you ever smoked, return the package with the unused Camels and we will refund its full purchase price, plus postage. *(Signed)* R. J. Reynolds Tob. Co., Winston-Salem, N. C.

Copyrighted material